DOMESTIC ENGINEERING

Whole No. 896. Vol. L. No. 7. 325 Dearborn St., Chicago Feb. 12, 1910

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THE SHORT-SIGHTED BRASS GOODS MANUFACTURER AND THE FOOLISH BUYER.

The cost of copper per pound is easily ascertainable by studying the metal markets as reported in the daily papers. The cost of rent, light, heat, power, labor, wages of superintendence and other expenses do not vary materially in different brass goods manufactories in the United States. If any one locality enjoyed superlative advantages in the purchase of raw materials or in the costs of manufacture, it is plain that the tendency would be for all other manufacturers of brass goods to flow to that peculiarly favored place in order to enjoy its unique advantages. It is also plain that by this very aggregating of manufacturing interests, the advantages which drew the manufacturers there would be shared by all equally, so that these particular advantages would therefore cease to permit any one manufacturer to sell below another, provided he makes and delivers the same grade of goods.

It does not require much of a training in economics to see that brass goods—speaking now in an all-inclusive and general sense—cannot be made any cheaper in Cleveland than they can in Decatur, in Milwaukee than in Cedar Rapids. In certain items, such as rent, the large city will be somewhat more expensive than the smaller cities and towns, while the city will enjoy some advantage—perhaps an abundant supply of labor—not met with in the smaller town.

Of course, we do not speak by the book, as could a manufacturing authority, when we say that the cost of production does not vary materially in different shops. We grant you that what manufacturers may think, is their cost of production, may vary, perhaps widely; but the scientific cost will not vary much in different shops.

Take, for purposes of illustration, a 4½-in. double bath-cock, an article in stable demand and made in perhaps forty or more plants in the United States. Let us consider that several samples of such a fixture, made in several widely separated places in this country, be brought together for comparison. If they are of the same grade of metal, and of the same weight

and identically of the same pattern, we venture to say that the actual cost of production and marketing of these several samples, could they be accurately determined, would not vary much.

Then how is it that the prices quoted to the jobber vary so greatly? How is it that a buyer so often has the ground taken from under his supposedly firmly planted feet by low quotations on a perfectly staple and unseasonable article?

There can be but one of several answers. Either—

It is not up to the standard weight—short of metal.

It is not made of standard grade of metal—short of quality.

It is sold below its actual cost—a shortage of knowledge in some person's mind. Or

It is being sacrificed by some one for some reason thought to be good—a shortage in brains.

These answers—which we believe to be correct—do not imply that there is no standard for brass goods. Certain firms have been too wise or unwilling to produce anything but goods of the highest grade. These form a standard which is tacitly admitted when the salesman argues that the line of goods he presents "is as good as So-and-So's." This is always the compliment the unworthy pays to the worthy. He sells them subject to that unreserved statement, and the buyer is usually sorry when he finds out the real difference between his purchase and what he knows to be standard.

The buyer for a wholesale firm should think twice before he abandons a well-known and standard line, proved by years of test and knowledge to be right in quality, and takes up a line concerning which he knows nothing but what the salesman has promised him. He has actually "marked down" all the good stock he has on hand. He has, by signing that one order, turned his back on a single-minded business policy which cannot fail to succeed, and set his face toward a whiffling and uncertain future.

Sometimes we think the manufacturers of brass goods would make a great stroke if they resolved with one another not to allow their goods to be sold by anyone not absolutely connected with the manufacturing of the goods. It was a sad day when the methods practiced by the late Clarence H. Rose became fastened on the brass goods manufacturers. The agent, who is uninterested in anything but the volume of his sales and the corresponding swollen sum of his commission, is a wicked invention of the evil one. There are good manufacturer's agents, and their ways are unobjectionable, but the buyers in the wholesale houses of this country would do well to familiarize themselves with the lines which are good, and with the men who represent them, and turn their ears away from the seductive sibilant sounds sliding so slippingly from the lips of the shameless substituter.

Ask us; we can probably tell.

FREE AIR IN CHEAP AMUSEMENT PLACES.

By Charles B. Starkey.

The other evening I thought that I would enjoy a bit of recreation and as the evening was balmy (some 8 above zero) I sauntered over to one of the ten cent theatres, one of the kind where they promise a dollar show for a dime and all done in an hour or so.

When I entered the room my breath was fairly taken away by the stench inside.

The floors were clean, no smoking allowed and I have reason to know that the place is kept unusually clean for I pass it every day and see the building going through the cleansing process, yet that smell certainly got on my nerves. This building has not been constructed very long and is one story only in height. There is a sawed off square dome in the center of the roof in which are some transoms, but this evening they were closed. Therefore the stench was simply due to air which was not free or pure, lacking the faintest symptoms of being such.

There are thousands of these small priced amusement houses scattered all over the United States and I desire to know what per cent of them make even the faintest pretentions toward proper ventilation or obtaining pure air?

The writer of this article has been in nearly every large city and many of the smaller ones in this country and has, at various times whiled away spare moments in some of these places and they all seem to be constructed pretty much on the same order with regard to lack of ventilation. (We are not discusing the open air amusement places).

In many of these shows the performance takes place in a room entirely without windows at the sides. There is generally a door at the rear and possibly one or two windows. If any draft be secured through the place these must be left open.

Many times in the milder winter weather the electric fans of these places are driven full blast to stir up the dead air which is often rendered more foul by the lights burned in obtaining scenic effects or by the powder flashed from the guns or pistols of the villians or heroes who prance about upon the stage. Thus are people deluded by these fans into thinking that the air in motion is more pure, whereas it only mixes up the various impurities a little more freely and thoroughly and with greater vigor. I have seen people coming out of these places the perspiration fairly dripping from their faces many times this winter.

As far as the heating arrangements go a stove or two or direct steam radiation generally suffices although in one or two places hot air furnace heat has been observed.

Yet these places are packed night after night with people who, should they attend a first class play house, court room, church or school and breathe the same amount of bad air, would raise a howl about the evils of modern ventilation, or the lack of wisdom displayed by the architect.

In numbers, these cheap places of amusement have increased enormously during the past five years, yet they seem to be allowed to run things pretty much as they please along heating, ventilating and sanitary lines in many parts of the country.

The sanitary part of it appears as follows: In some of these places the show lasts for from one to one and one-half hours. If a person enters after the show has started and stays (as is permitted) to witness the entire performance, they will have remained about two hours or perhaps more.

Should the necessity arise for using the toilet there is none at hand and the party so desirous may be several blocks or nearly half a mile from home. The necessity for such conveniences at once becomes apparent and it would seem as if some means should be taken to bring about a correction of

this want of public comfort in such places. The lack of sufficient and proper sanitation in such houses can at once be seen when one stops to give the matter a thought.

These places make money and some of them entertain as many as two thousand people or more each day and it would seem that some provision should be made whereby they be obliged to provide for the health and comfort of their many patrons.

The air in large cities, and more especially in the crowded portions where these amusement places are generally found, is none too good at the best and if it could be said that the air in these houses was as pure as the air in the street one would not be saying very much in favor of pure air for it is found that at the level of the street many impurities exist in the city air. Fragments of sand, fine hairs, soot, cinders, particles of lime, ashes, brick dust, steel abrasions from the surface and elevated street car rails, all these we breathe every day as we go about our business and our lungs and nostrils fairly reek with these impurities. This winter there has been a large quantity of snow. Examine its surface and observe for yourself the impurities.

Is there a remedy for these evils regarding ventilation? There certainly is for in the larger public buildings the air is strained or washed by means of air-washers before it is allowed to enter the building, rendering it wholesome, pure and invigorating and, as the writer views it, some such steps should be taken regarding these cheaper places of amusement.

VARIABILITY OF INTERIOR CONDITIONS IN SCHOOL ROOMS.*

By H. W. Whitten.

The following paper is published with the same object sought by H. W. Whitten, i. e., to prove how little is really known concerning the factors affecting general and specific systems of ventilation.

The figures "are taken from inspectors' reports on Massachusetts school buildings, compiled by Joseph A. Moore, deputy chief, Massachusetts District Police, and show the remarkable difference in interior conditions with apparently similar volumes of supply and degrees of temperature. These tests were made at various times during the past eight years, and Mr. Moore states that they are a fair average of conditions found by the inspectors of his department."

"It will be noted that in many cases the outlet volume is twice that of the inlet, while in others the reverse is the case. The effect of this variation on room temperatures is, however, not consistent. In some cases the temperature of the room is higher than that of the air supplied at the inlet, while the volume of outlet air is very much greater than the supply. In cases of this type Mr. Moore says the other rooms in the building were being robbed."

"He further says that nearly all the apparent inconsistencies were on account of outside winds causing in or out leakage through outer openings."

As Mr. Whitten said in presenting the paper he did not offer any explanation of the obvious discrepancies. It was understood that the rooms in which the tests were made were approximately all the same size, and the observations were taken while the classes were in session, and presumably, when atmospheric disturbances due to entrance and exit had ceased.

One of the most glaring inconsistencies is to be noted in the latter part of the table where we have an outside temperature of 43.5; an inlet 66; temperature of room 75; temperature at grill 74; inlet volume, cu. ft. per minute 1,943; outlet volume, cu. ft. per minute 3,300.

OUTLET			INLET		
Temperature Outside.	Volume Cu. Ft. per Minute.	Temperature at Grill.	Volume Cu. Ft. per Minute.	Temperature at Inlet.	Temperature of Room.
5.5	2,996	68	1,864	115	52
12	3,003	76	2,229	95	77
13	1,503	67	1,589	110	58
13	1,578	80	1,458	120	62
13	2,475	74	2,508	112	53
13	2,320	76	2,708	120	59
14	2,460	72	2,054	95	67
14	2,804	67	2,250	110	66
14	2,981	71	2,194	110	69
14	2,724	72	1,914	88	70
15	1,305	69	1,457	110	67
16	5,860	70	3,122	75	80
16	2,207	62	2,938	72	64
17	2,700	66	1,599	80	65
18	2,806	71	2,079	109	71
19	2,833	80	1,877	108	71
19	2,945	76	1,596	100	70
19	5,464	77	3,914	102	75
19	1,215	72	2,040	96	69
19	1,927	62	1,336	84	60
20	2,390	72	1,506	92	74
23	1,665	65	1,173	93	65
23	2,461	70	1,948	90	65
24	3,162	75	2,329	98	74
24	2,848	76	2,417	81	75
24	4,603	70	3,647	83	71
24	2,517	68.5	2,735	77	69
24	2,638	71.5	1,931	84	70
24	4,239	66	3,308	73	67
25	1,868	77	1,070	120	74
25	1,371	73	1,224	124	73
27	2,283	76	1,540	96	72
27	2,336	72	2,172	95	70
27.5	2,375	84	2,461	120	79
27.5	1,710	76	1,800	85	74
28	2,009	70	1,793	70	70
28	3,950	72	3,612	75	68
28	1,888	71	1,727	80	70
28	1,515	74	1,535	84	73
28.5	1,188	69	1,039	91	73
29	2,740	68.5	1,812	80	68
29	6,330	69.5	2,172	80	68
29	2,924	69	1,670	74.5	66
29	2,899	70	1,779	80	67
29	2,276	68	1,445	70	69
29	4,503	61	1,685	58.5	62
31	1,820	72	1,600	68	72
31	1,685	72	1,630	79	71
31	1,817	69	1,281	66	69
31	1,628	69	1,320	75	67
31	1,568	66	1,388	77	66
31	2,043	69.5	2,000	76	67
32	1,938	68	2,092	77	68
32	2,242	69	2,115	74	69
32	1,369	68	1,173	65	68
32.5	2,480	74	2,330	90	70
33	1,200	75	2,236	114	75
33	1,360	73	1,573	92	71
34	1,874	72	1,314	81	70
34	1,092	70	1,081	90	67
34	3,745	74	1,752	85	70
35	1,709	71	1,230	77	68
35	1,848	74.5	1,311	85	71
36	2,650	74	1,289	86	69
36	3,218	67	1,570	90	64
36	2,251	72	1,176	97	66
36	2,665	70	1,459	90	63
37	1,904	70	1,573	80	68
37	1,825	69	1,565	85	69
37	1,958	74	1,298	81	70
37	1,659	70	1,142	87	67
37	1,991	60	1,784	60	64
38	2,551	67	1,233	95	67
38	2,483	79	1,728	85	71
38	2,709	69	1,807	76	66
38	2,350	72	1,813	94	67
38	2,347	72	1,248	80	68
39	1,738	67	1,458	70	69
39	1,610	70	1,404	56	72.5
39	1,634	65.5	1,191	78	68
40	2,003	73	1,909	100	65
40	2,515	72	2,185	92	66
40	2,255	70	1,434	82	66
40	1,707	67	926	75	64
40	2,095	69	1,269	85	65
40	1,064	65	1,443	77	65
41	1,722	72	1,105	93	69
41	1,734	75	1,491	90	73
42	1,635	76	1,865	87	76
43.5	3,300	74	1,943	66	75
44	2,779	76	1,790	90	71
44	2,411	72	1,772	78	71
44	1,309	75	1,932	90	73
44	1,290	75	1,314	92	70
44	3,085	68	1,975	73	66
44	2,178	68	1,297	60	68
44	1,709	71	1,361	70	72
44	2,862	69	1,913	70	68.5
44	1,894	72	1,067	77	70
46	1,599	65	1,516	70	65
46	1,225	70	1,499	79	67

The explanation offered by Mr. Moore that the other rooms in the building were being robbed in such cases does not seem to be satisfactory in this particular case. It ceases to be a robbery, it is a hold-up with atmospheric violence to produce such discrepancies in the conditions. We will be glad to receive comments on this paper for publication in our journal.

Hunter & Harris, Flint, Mich., have retired from the plumbing business.

*Presented at the sixteenth annual meeting of the American Society of Heating and Ventilating Engineers, New York City, Jan. 20, 1910. Reproduced in excerpt form in compliance with the Society's ruling.

DISTINCTIVE MARK AND EQUIPMENT OF COMFORT STATIONS.

By Frank K. Chew.*

America being a comparatively new country has nevertheless taken up with the good things which have been brought to its attention by those who have come from the other side of the ocean and in many instances has created surprise by the manner in which it has outstripped those who founded good practices and the advances beyond them which have been shown here. The public comfort station is a comparatively new provision for our citizens and while attention and energy are being devoted to providing them for our people it is well within the province of this society to organize a movement for the selection of some distinctive mark for such stations. Unfortunately while the need of such a mark has come to me the design for it does not accompany it. I believe that it is possible for a mark to be selected that can be recognized in any language as is the Red Cross by those who need medical or surgical aid. It is realized that the public comfort station in many instances is arranged to be used by both men and women, the entrances being separated as far as possible. It is quite probable that after the provision of the larger comfort stations in busy centers in large cities, smaller stations on well-traveled thoroughfares in less populous districts will be recognized as essential and be established. When they are small, naturally there must be two stations, one for men and one for women. Then the distinctive mark must be of such a nature that without material change it can be used to indicate which is arranged for the use of men and which is arranged for the use of women. In this connection there is no objection to stating that a comfort station, in one corner of which is located a drinking fountain, another a lavatory, in another a urinal and in the final corner a water closet to be periodically visited by the officer on the beat and be in charge of a visiting caretaker, in many instances will serve an excellent purpose and the cost of such stations would enable a number to be erected for the same sum that would be required for a larger station in some center of traffic.

In the much vaunted civilization of which mankind is so proud very little has been done for women and some amends will be made for the neglect if at this late date the separate station is provided.

Nature has brought to women a constantly recurring period of distress for which man in the highest type of civilization affords little relief or amelioration. If through the aid of church societies, Young Women's Christian associations, and women's clubs, arrangement for some convenience which would afford some measure of relief were brought to the attention of women with a full and complete explanation of the purpose and objects of the provision there can be but little doubt but that they would be welcomed and used. It is well within the province of a public comfort station to include in the equipment for women a machine operated by the use of a small coin dropped in a slot whereby a sanitary cloth could be procured. It is done in some isolated cases in buildings devoted to the use of women, but up to the present time no public comfort station includes such a convenience. It is equally important, and no more difficult, to provide a receptacle for the discarded cloths. Manufacturers of sanitary goods or apparatus only need to have the demand for such equipment brought to their attention to produce something which will be neither objectionable in appearance nor in effect. Certainly the smaller type of comfort station suggested in this paper should include in the equipment of those for the use of women both of the conveniences suggested. If America should have the honor of selecting the distinctive mark suggested and be the first to include in the comfort stations for women the devices indicated, and should the incentive to its citizens to this achievement find its origin in our society, further example of its usefulness will have been shown.

*Read at the fifth annual meeting of the American Society of Inspectors of Plumbing and Sanitary Engineers, held at Trenton, N. J., Jan. 20-22, 1910.

SEATTLE'S FIRST DOWN-TOWN PUBLIC-COMFORT STATION.

By Clancey M. Lewis, S. B.*

The man of travels will find nowhere in the Eastern hemisphere a sub-surface public-comfort station equal in character to that which has recently been completed in the downtown district of Seattle; and in the United States there are very few that will be found to equal it. When Mayor Miller, Councilman Weaver and Dr. J. E. Crichton (superintendent of the health department) presented the needs of such an institution to the Park Board, part of the local press started off on the wrong foot and instigated some opposition, but Ferdinand Schmitz, the board's executive on the project, said he would build it first and then if the people objected to it he would remove it at his own expense, and the work was allowed to progress. This same agitation, however, excited suspicion of the owners of the business buildings facing upon Pioneer place, and one of them was at the point of securing an injunction; he let the matter drift along and when the station was completed he inspected it and expressed himself as glad that he did not carry out his threat.

Roland W. Cotterill, secretary of the Park Board, states that the public-comfort station has been one of Seattle's best advertisements. He has expressed himself as surprised at both the character and geographical distribution of the inquiries he has received about it.

When one realizes that public-comfort stations of this character are among the newest municipal features, East or West, it naturally pleases Seattle to be looked to for example and precedent. This is the condition that has prompted the writer to prepare a complete dscription of the institution.

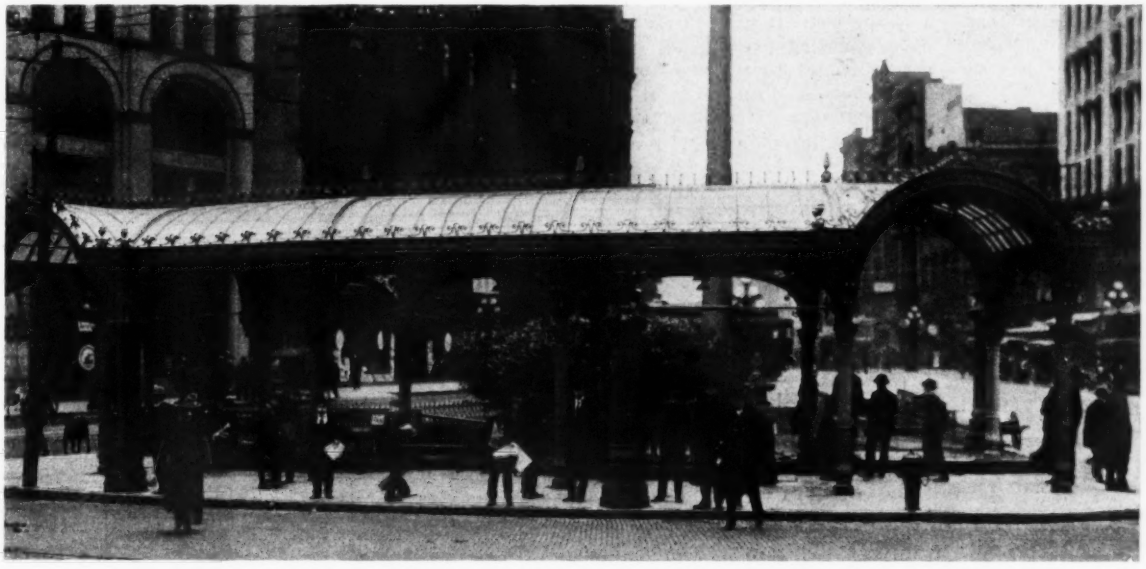
The contract for the station was let in the spring of 1909 and became a public convenience on September 23, although it was not properly completed until November 15, 1909. The finishing touches to the superstructure were put on during the week of January 15. The comfort station as it stands, an addition rather than a detraction to Pioneer place, cost the city $24,505.85. The location, First Ave. and Yesler Way, is at the cross-roads of the city's greatest activity. Three of the four nearest street corners are occupied by banks, and the fourth by the city ticket-office of one of the transcontinental railroads. Two of the crosstown and the Tacoma interurban car-lines terminate within a block of it; it is also passed by a large majority of the Puget Sound and coastwise steamship passengers. It is on the base of the triangle, the apex of which is occupied by the totem pole that has made Seattle famous.

In the design and construction of a public-comfort station the first consideration is sanitation. Perfect ven-

* Editor "Pacific Builder and Engineer."

tilation, abundance of light, and cleanliness always take precedent of the ornate, and the architect restrains his pretty touches to the last. This fact is the cause of some of the criticism that has passed current on Mr. Everett's canopy. It is certainly substantial and useful, if not particularly ornate and delicate of line.

The supporting columns, of Corinthian design, each weigh about 500 pounds. The ventilating columns, of which there are four, each weigh 2,000 pounds; these columns also carry fixtures for four lights each. The entire roof of the canpoy is covered with wire glass, which was installed by the Westlake Sheet Metal Works.

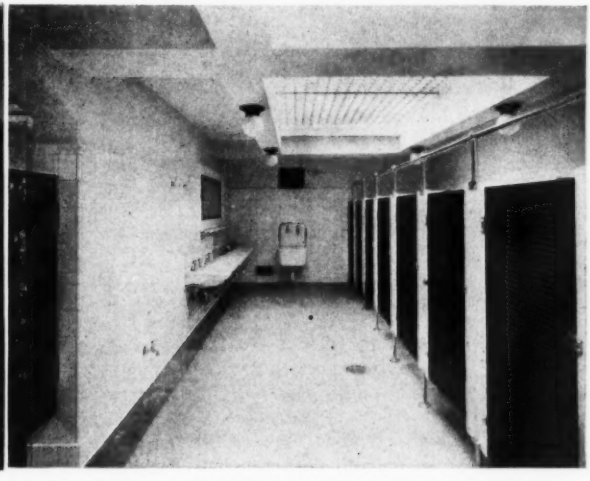


Ornamental Iron and Glass Canopy Over the Pioneer Square Public-Comfort Station, Seattle, Wash.

Pioneer place is like the squares of Boston, all triangles, and has for its base 75 feet of Yesler Way and for its altitude 120 feet of First Ave.; the sides are, for practical purposes, equilateral. The public-comfort station is laid off with its greater dimension on the base, and occupies a ground space 60 by 35 ft.

The entrances to the women's and men's sections of the station are at opposite ends of the canopy and protected by heavy grill railings, which were also a part of the work done by the Artistic Works. The approaches are over concrete and the stairs are of solid reinforced concrete finished terrazzo, while the stairway walls are

Ante-Room in Women's Section of Seattle's New Public-Comfort Station.



Main Room of Women's Section in Seattle's New Public-Comfort Station.

The public-comfort station proper was constructed under a general contract awarded Thomas F. Flynn, and the superstructure by the Artistic Ornamental Iron & Wire Works.

The canopy is a combination of cast-iron posts with ornamental bent iron bracks, cornice and ridge line. A total of 65,000 pounds of iron work was used on the job.

of red tile, nine in. square. At the foot of the stairs to the men's section there are two entrances, one leading to the right into the shine and caretaker's room, and one to the left into the main station, each of which are fitted with extension iron-gates.

The floor of the entire station is laid with a heavy foundation of solid concrete and finished with terrazzo,

draining to the center of each room. The walls are laid up to a height of six ft. with white tiling, six in. square. All stalls are divided by large slabs of gray-streaked white Alaskan marble mounted on nickel-plated brass sanitary legs; the same quality of marble is used in the finish of the shine stands. The walls above the tiling and the ceilings are finished with cement in an ivory tint.

The peculiar character of the installation, with the unusual demands placed upon plumbing fixtures, not only necessitated thorough work upon the part of the Courtney Plumbing & Heating Co., but called for the most exacting specifications in the goods themselves. A total of sixty-one fixtures were supplied by the John L. Mott Iron Works, New York.

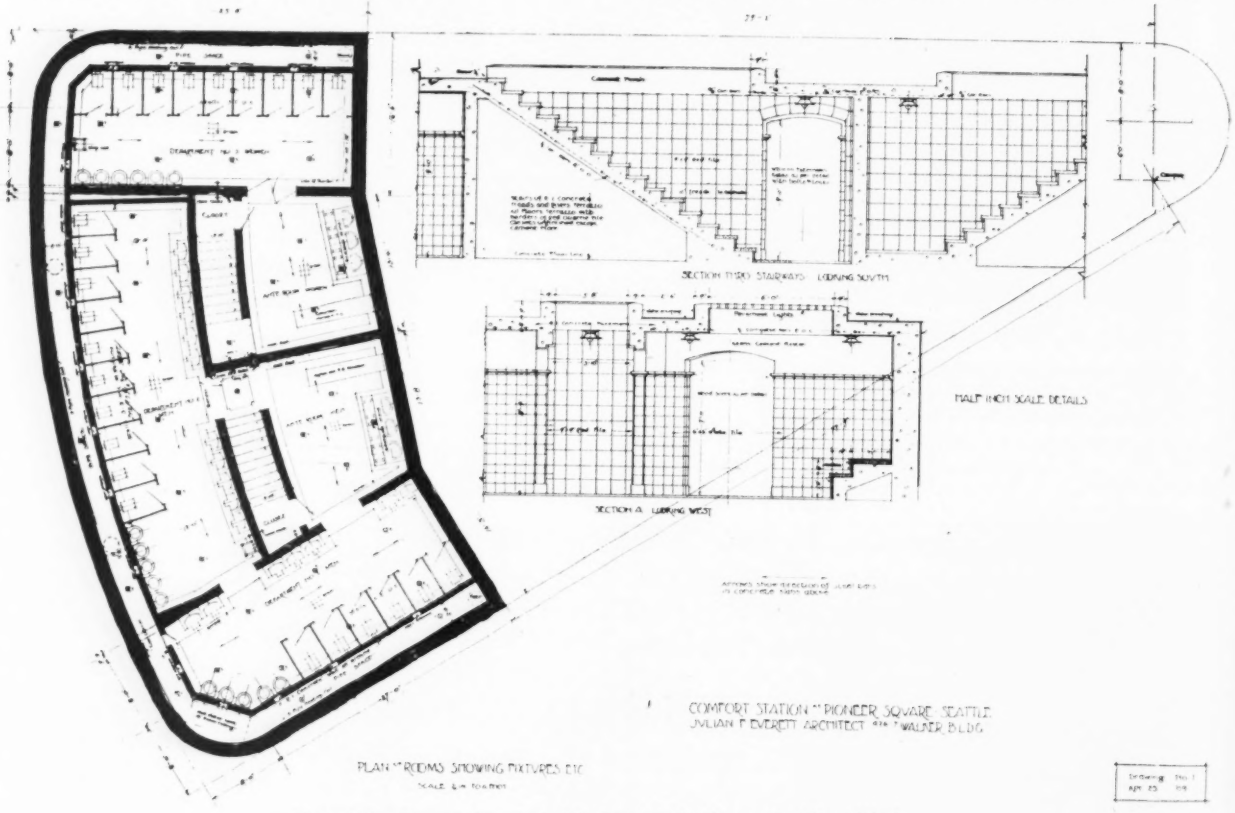
As the plumbing is the principal feature in the equipment of a comfort station a detailed description with the allotment of the fixtures will be given:

cessories with iron pipe size "Dial" trap, nipple and supplies to wall, with ½x⅜ in. milled wheel handle angle valve and union. The basin is semi-circular and 10 in. in diameter.

The slop-sinks are of class "A" porcelain, 18 in. high, with loose back, nickel plated brass-strainer, bronzed iron trap-standard for lead pipe and 2-in. hub vent; size 22x18x12 in.

In the men's free room, which is 12 by 40 ft., there are 10 toilets, 5 lavatories, 4 sets of urinals, and 1 sink; in the pay room, which is 12 by 30 ft., there are 6 toilets under key, 5 lavatories, and 4 sets of urinals. In the women's room there are 9 toilets (2 under key), 6 lavatories and 1 sink.

The problems of heat and ventilation have been handled in an unique manner with highly satisfactory results. The apparent absence of any features connected with either


SECTION (1150) STAIRWAYS LOOKING SOUTH
HALF INCH SCALE DETAILS
SECTION A LOOKING WEST
COMFORT STATION "PIONEER SQUARE SEATTLE
JULIAN P EVERETT ARCHITECT 414 WALKER BLDG
PLAN OF ROOMS SHOWING FIXTURES ETC

Plan of the Pioneer Square Public-Comfort Station at Seattle, Wash.

The closets are of the "Beekman" style with Boston vent, 1½-in. cherry automatic seat with extension through the wall, rough brass flush-pipe with nickel-plated pipe from the wall to the inlet of the closet, "Bumper" galvanized iron lifting rod and guide, cast iron galvanized cistern, and brass floor-flange with porcelain bolt-caps.

The urinals are of the "Eclipso" pattern and are made up in sets of two and three stalls each. These urinals are made of Mott's imperial porcelain with the same quality of drip receptors, with vitreous china automatic flushing-cisterns for each set, with nickel plated flush-pipes for each set, brass brackets, spreader and inlet couplings, and brass waste-plugs and couplings with removable porcelain gratings.

The "Veritas" vitreous lavatories are made with integral backs and wall supports, patent overflow, complete ac-

system is certainly the strongest detail of the design. This has been accomplished by a 2-ft. air space running around three sides of the station. First a 12-in. area wall of plain, solid concrete was constructed and inside of this a false wall 6 in. thick and of reinforced concrete. On each of the three sides of the area wall is mounted a 6-coil pipe supplied with steam from the central-heating station of the Seattle Electric Co. The air space is connected with the main room by attractive bronze gratings located about 8 in. above the floor level and at 6-ft. intervals. The desired temperatures throughout the station are thus secured by indirect radiation. Each of the ante rooms is secured against too low a temperature by 9 ft. of direct radiation.

Every toilet is ventilated from beneath the seat by a pipe which leads to the foot of the vent posts, of which

there are four. Individual motor driven fans with a capacity of 12,000 cu. ft. per minute are installed at the foot of each vent post and there pick up the foul air, discharging it at an elevation of 11 ft. above the pavement.

The air space is further utilized for the installation of all flush tanks to the toilets; for a suspended cylindrical 300-gallon galvanized iron hot-water storage tank; for the cooling coil and steam-traps; for the indirect connections of the two catch-basins which receive the roof water and discharge it into the sewer; and for the connections with the combined trap and back-water valve that is installed on each floor-drain.

Plenty of sunlight is always a requisite of cleanliness and perfect sanitation, and in a surface station it can easily be secured by adequate window space, which is out of the question with an underground installation. One would hardly believe it, yet the generous use of the American bar-lock sidewalk light with white tile, marble, and ivory ceilings makes the interior of the station seem brighter than the outside, and illustrations shown with this article are the results of time exposure only.

At night the rooms are abundantly lighted by electricity through ceiling globes.

There is an area of 376 sq. ft. of American bar-lock sidewalk lights used in the construction of the comfort station in Pioneer place. These lights have the white porcelite frames which aid in the diffusion of light, as the white, exposed surface frames tends to refract the light, and renders the glass and frame construction free from shadows; a feature in itself. Each coat of porcelite enamel is baked on the finished frame under a high temperature, making a permanent white vitreous covering, which is both durable and ornate, and which is not affected by heat or dampness, and is absolutely free from corrosion. The arched, plain lights used are made of the best annealed crystal glass obtainable by a slow process of thorough tempering. The Bar-lock's frame construction itself gives the maximum amount of glass area and

Pay-Room in Men's Section of Seattle's New Public-Comfort Station.

at the same time gives the maximum amount of tensile strength.

Each ante-room of the two sections has marble shine stand, is furnished with 3 oak armchairs, brass foot-rests and accessories; also showcases with toilet supplies, and in the men's division with cigars.

The station was designed to accommodate an attendance of 10,000 per day of 18 hours, from 6 a. m. to 12 o'clock midnight. The average week day attendance has been checked to be 5,000 and the Sunday attendance reaches 8,000.

The operation of the station is conducted under a concession granted D. W. Ring and wife who, with the assistance of three others, keep it up to the satisfaction of J. W. Thompson, superintendent of parks, in consideration of the revenue secured from the following authorized charges:

Free-Room in Men's Section of Seattle's New Public-Comfort Station.

Shines, 10 cents each; individual towel and soap, 2 cents; and closet, towel and soap, 5 cents.

In the development of a modern city, beauty and the comfort and convenience of the general public play a prominent part. One of the chief demands of a city's park development is to afford sanitary toilet conveniences for the hundreds who take advantage of these breathing spaces, and to make these places conform to the general idea of beauty and harmony in the landscape effect.

PITTSBURGH AND VICINITY.

The contract for the heating system in the fine new residence that is being built at Butler, Pa., for William H. Miller has been awarded to Royer Jenkins, of that city, who will install a hot-water heating system.

J. W. Lawrence, Beaver, Pa., has been awarded the contract for the hot-water heating system that is specified for the handsome new residence which is now being built there for Frank Croft.

The heating contract for the new residence now under course of construction at Connellsville, Pa., for J. L. Fritch has been awarded to William Sellers, the local heating engineer.

One of the best plumbing contracts that has been awarded in Wilkinsburg, Pa., this winter has just been awarded to the Boore Plumbing Co., Pittsburgh, Pa., and calls for the installation of high-class plumbing systems in eight new residences that are being built this winter for D. L. Dillinger.

Regan & Hormell, Charleroi, Pa., have recently been awarded the contract for the installation of the plumbing systems complete in about seventy new miners' residences that are being built at the local plant of the Pittsburg-Buffalo Co., of Pittsburgh, and at several of the other coal mining towns of the same company in Washington county. These miners' houses are all of modern construction, and unlike the usual run of such houses, each will contain a modern bath room with running water, modern kitchens and range boilers. There will be a large number of plumbing fixtures required, all of which will be installed in a short time, as the houses are to be completed this spring.

THE PRIVY, ITS USES, ABUSES, DANGERS AND ARRAIGNMENT.*

By Burton J. Ashley, Consulting Sanitary Engineer, Chicago, Ill.

The privy is a primitive institution used by primitive people to serve a primitive purpose and always will be. Comparing its use with the Mosaic practice (Deuteronomy 23:13) it is more respectable but less sanitary. Moses knew the powerful qualities of the upper soil to purify, without probably knowing the reason why. If all reports are true, the Chinese nation still only know that much and have not advanced beyond Mosaic practice—perhaps have retrograded from it in some particulars. England and the United States furnish examples of the most advanced sanitary practice and in that particular are leading the world in their adoption of sanitary conveniences which in turn safeguards health until our average mortality is growing considerably above the proverbially "three score years and ten."

That the privy is a necessity as a primitive measure goes without saying. Among the poorer classes nothing better can be used. In unsewered districts of cities there is nothing better adapted to the purpose.

Privies are built in two ways, viz.:

(a) Without a Vault—called "Privy Midden," the word "Midden" meaning "dung hill."

(b) With a Vault.

Of the two, the privy midden is by far the more sanitary.

Providence has endowed the surface of the earth with natural forces, that make for purity and cleanliness, viz.: air and soil. They are nature's great purifiers and both are necessary to the natural purification of any organic decaying substance.

Decay is the first step towards the purification of dead organic or animal tissue. Such decaying substances are inimical to human or animal life, especially if the substance be the dead body of animals or human beings or the decomposing products of their living, and therefore dangerous to life and should be transformed in such a manner as to protect human life from scourge of pestilence or death which such decaying substance might and is liable to create. During the stage of decomposition, the fluids and gases produced are very toxic, i. e., poisonous. When this toxicity has spent its force, then the resultant fluid or substance is without danger of infection. As decay proceeds the air provides oxygen necessary to the chemical change taking place and provides as well, the means for receiving and disseminating the gases which are produced by such decay.

The soil on receiving parts and particles of such decaying substance whether liquid or solid, performs the exceedingly purifying function of nature—nitrification, through contact of the dissolving particles with air and which is made possible by the arresting of these particles in the upper soil where the atmosphere is in abundant contact, and this nitrifying or aerating process is the final process necessary to the conversion and complete purification of all organic decay, and satisfactory purification is impossible without it.

So long as the soil is not gorged or overworked it is to humanity one of the greatest known safeguards to life, saying nothing of its function in producing sustenance for all living beings. Gorge mother earth with pollution and she gets sick and refuses to respond, and here a lesson must be learned in the use of the privy. So long as human excrement is deposited in a favorable manner and in quantities limited to the capacity of the air and soil to convert it, the act of using a privy is in direct agreement with the laws of sanitation and health. It is in the abuse of this natural fundamental safeguard that danger arises.

Enough has already been written by eminent sanitists of both this country and of Europe as to what labor and attention is necessary to maintain a privy properly; and without discoursing upon the subject further, we will append the following formula as containing the elements of a satisfactory maintenance, viz:

(a) Don't over-pollute the soil about the midden.

(b) At reasonable intervals remove the collected excrement.

(c) Provide the privy with plenty of fine dry dust, or dry pulverized earth.

(d) So construct the privy as to prevent access of either fowls or flies.

Soil pollution about the privy midden is due to liquid soakings only. With good aëration, the soil surface has a tremendous recuperative power. Let the air circulate freely under the privy and over the soil.

Keep the solid excrement removed in order to permit the contact of air to the soil where the midden is collected. Don't bury excrement. Scatter it thinly on cultivated ground and sprinkle one or two inches of dirt on it. The soil will do the rest and do it rapidly, effectually and safely.

Don't use lime. It retards purification and only lessens the odor temporarily. Lime or like disinfectants is a bactericide merely retarding nature's effort. Decomposition is absolutely sure to set up again as soon as the strength of the lime has run its course and is exhausted. Use dry pulverized dirt—not moist dirt—but dry fine dirt. Road dust cannot be equalled by anything. Dirt is not a disinfectant but a deodorizer and facilitates nitrification, nature's great purifying process. Lime retards it. The earth or dust also forms a vehicle with which the decomposing substance can be mingled and inoffensively carried away.

Give the space beneath the privy plenty of air, but screen it off from the barn-yard fowls and flies. The former for reasons that need no repetition. The latter because of their unending migration to and fro from filth of any kind to the food on your table upon which they will crawl and pollute.

I visited a camp in the Adirondacks last summer where every appointment but the privy closets was the best, but the privy closets were supplied with damp earth instead of dry and deodorization was a failure. Shortly after I visited a well kept camp in Michigan and leading from my sleeping room was a dry earth closet that was provided with dry earth and deodorization was perfect. Not the slightest odor whatever could be detected even in the atmosphere of the room.

The midden privy rightly built, not overused and well attended to is not a nuisance nor even dangerous, but the proneness of humanity to neglect and procrastinate, is largely the cause of the privy nuisance everywhere and we must stop to enquire whether it is the privy or the user that is at the bottom of the trouble. The proneness of the human animal to produce and affiliate with filth has been the cause of all the great epidemics and so long as said human animals show contempt for respectable inodorous sanitary conveniences, just so long does he invite epidemic.

For modern achievement in midden privy design and

*Read at the fifth annual meeting of the American Society of Inspectors of Plumbing and Sanitary Engineers, held at Trenton, N. J., Jan. 20-22, 1910.

regulation, laurels must be handed to the City of Richmond, Virginia. There the unspeakable vault is prohibited; the size and design of the privy is prescribed; and Musca domestica—the typhoid house fly—is screened out from beneath and a screened window is inserted in the privy for ventilation. Dr. E. C. Levy, Health Officer of Richmond, is deserving of his full portion of praise for the present sanitary conditions existing there.

A privy vault is an example of barbarous engineering. Migratory tribes still resort to the "hole in the ground," knowing their abiding place is only temporary and that the tribe will be well out of the way before serious dangers can arise. Enlightened humanity imitates the barbarians only in that he digs the hole. He differs from the tribal savages in, that after digging the hole he stays by it and instead of trying to reform it or improve it, he digs it larger and deeper. This class of safeguarding human life is no higher in its conception than that evinced by an ostrich when she runs her head under the sand to prevent her bodily destruction by the simoon. The ostrich is just as good an engineer as he who advocates the privy vault or its unheavenly twin, the cesspool, as a means of safety. Safety does not consist merely in getting dangerous elements out of sight.

The privy vault gives the purifying forces of nature no opportunity to purify. Decay cannot proceed farther than to begin, and nitrification, which is the real purification, cannot even begin, and, so the contained befoulment in the privy vault or cesspool remains befoulment, sickening and debauching the earth around it.

No reasonable amount of attention possible will ever make this unholy hole clean or sanitary.

There is some possibility of keeping the midden privy reasonably clean and sanitary; the privy vault in no wise can be kept clean.

Abuses.

The shortcomings of humanity must here be brought before the bar of sanitary cleanliness and, tried, will convict 99 per cent. of the people who would be highly offended to be regarded otherwise than clean and respectable.

Show me a privy and I will tell you whether the owner is a desirable citizen or not. Nor does this widespread neglect lie at the door of the poor and ignorant of our cities alone. Go into the farming communities and you will frequently meet as deplorable a condition of privies, convenience and maintenance as of the squalid inhabitants of cities whom our respectable farmer cousins would scorn to associate with. Nor should the proprietors of large numbers of country hotels be spared in this particular as they are not a whit behind the farmer, and proprietors of many railroads are as neglectful of privy maintenance as either the hotel proprietor or the squalid citizen of the city.

The sleeping indifference, ignorance, stupidity, filthiness or what-not of some people to the necessity of maintaining sanitary and respectably privy accommodations is distressing, and many of the hotels in country towns, including privy accommodations at the depots of some of the wealthiest railroads in the land, are such as to make one cry out for shame and disgust. Accumulations have been permitted until the use of the privy in some instances is impossible. To breathe the very air in or about some of these vile places is most revolting and disgustingly suffocating. The evidence of any attention is usually entirely wanting. The opposite is the exception and not the rule. Are health authorities sleeping that these malignant pest spots should exist within corporate limits? Were it not for hurling a bomb into the center of this convention, I would publicly name two or three cities represented here that are permitting conditions at railroad depots so disgusting as to repel swine. If local laws are inoperative and at fault, and not the officials that should enforce them, then let laws be made, that will oblige some of these caterers to public patronage into being at least respectable, if not entirely sanitary.

Progressive people are no longer tolerating primeval inconveniences. Selfish landlords in large numbers may be classed among non-progressives and the disregard they show for the lives of the tenants who fill their coffers is disquieting and barbarous, and comparable with the inaction of many railroads or other corporations in maintaining sanitary conveniences for their patrons and employes.

No one save the ignorant or the knave will resist or grumble at the demand of any health officer to "clean up." Such derelicts would not want a neighbor to maintain under his nose the insalubrity he is willing to hand out to his customers or to his employes.

Dangers.

Dr. R. W. Johnston, the inspector appointed by the Local Government Board of London to inquire into an outbreak of enteric fever in an urban district, reported that the existence of privy middens were responsible to no small degree, for the dissemination of fevers by the transmission of the infection by house flies and by other ways and followed his report by a recommendation that the London Council should adopt measures to hasten the conversion of privies preferably into water closets. He further recommended the emptying of privy middens at intervals not exceeding two weeks and, if possible, weekly. We recite this instance to call attention of the American reader to the degree of attention which our English cousins regard as good sanitary practice in caring for the privy.

We believe it unnecessary to enter into a lengthy essay of reasoning to induce the common mind to recognize the danger to human life that may arise out of both the use and abuse of the common privy.

Perhaps the following illustrations will be sufficiently potent in fixing in the mind the possible dangers that may arise out of the existence of neglect of a privy.

Pollution of wells from leaky privies is disgustingly common and dangerously prevalent, but increasingly so in rural districts. It is a very disquieting sight to see chickens filling their crops from the filth of the privy and to their having free access to the well-curb or pump platform. Nor is it pleasurable to realize the dire effects possible in consequence of house flies crawling upon middens with the consciousness that they will shortly visit your table and crawl over your food, leaving sickening morsels thereon for you to swallow.

A recent investigation at Salem, Ohio, disclosed nineteen cases of typhoid fever in families, every one of which were patrons of a dairy that had hitherto been regarded as having been maintained in a good sanitary manner. Upon probing deeper, however, the following facts were brought to light. After the bottles and utensils had been washed and scalded, they were rinsed and cooled with water taken from a well within twenty feet of which was a privy vault, the contents of which were flowing over the ground. Analysis made of the water, it is needless to say, revealed the dangerous pollution that had been caused by the use and neglect of the privy.

One can scarcely conceive of the countless ways in

which ground or wellwater pollution can take place, in consequence of neglected privies or cesspools. Add to this other countless ways that communicated pollution may reach the alimentary canal through contact and one can readily perceive the danger that can arise from the misuse and neglect of this questionable convenience.

But let us not condemn finally this much abused contrivance until a fair trial is had by submitting the testimony of those best qualified to give evidence.

The Arraignment.

To bring this matter to trial the following question was asked of the health authorities and inspectors of the one-hundred largest cities in the United States: "What good or bad have you to say of the privy?" and the following are extracts from the testimonies received:

Testimonies.

"The vault closet is undoubtedly one of the most prolific disease-spreaders existing in any community, being a receptacle for not only the disease-bearing, germ-filled excrement from affected persons, but is also a depository for all manner of filth, old rags, and even sputum from persons affected with tuberculosis. It is at the same time a breeding and feeding-ground for countless numbers of flies. These flies, owing to their migratory nature and their disposition to track over foods prepared for human consumption, must assuredly carry on their feet and bodies more or less bacteria from the contents of the vault. It will be readily apparent to any thinking mind that the vault closets, through the medium of that common house-fly, is a very dangerous as well as offensive institution."—Seattle, Wash.

"Privies, even under best conditions are a menace to public health, favoring especially the spread of typhoid fever. There is not a more prolific source of disease than the ordinary privy, swarming with flies at all times, except meal-hours, when these same flies may be found in the kitchen and dining-room, wiping their filthy feet on the food. Open dry closets in a city must be regarded as an ever-present danger not only to those forced to rely on them and to their immediate neighbors (though these are, of course, the worst sufferers), but also to the entire community. These dry closets and wells constitute a menace the importance of which can scarcely be exaggerated."—Richmond, Va.

"The privy vault as a rule is a foul breeding-spot, particularly in cases where typhoid fever has existed and the discharge from the patients are emptied into said vaults, where, through ignorance or neglect, the discharge has not been disinfected. The privy vault is often a menace to the water supply of a premise or dairy where the water supply consists of well water and the drainage from the vault slopes toward the well."—Newark, N. J.

"The so-called "privy vault" is a nuisance to those who are so unfortunate as to have to use it and invariably they are a vile nuisance to most people in the immediate vicinity. The emanations from a house drain are apt to cause most people considerable apprehension, though these same people will use the privy vault without any visible sign of inconvenience."—Los Angeles, Cal.

"The department of health does not hesitate to express a very strong condemnatory opinion, both on the ground of offensiveness and the more important reason of menace to health. We have no doubt that food supply is contaminated unnecessarily by passage of flies from privy vaults to kitchens and food-producing establishments."—Chicago, Ill.

"It is the most foul nuisance, very liable of neglect on account of its filthiness, a breeder of all kinds of diseases and not to be tolerated a minute where it can be done away with, by replacing it with a sanitary appliance."—Fresno, Cal.

"A privy is a nuisance wherever built. Mother earth is continually absorbing the contents and delivering it into our own or our neighbor's wells, thus contaminating the water we think is pure."—Saginaw, Mich.

"The box closet or any privy vault is a stinking proposition and ought to be replaced with a more up-to-date method which can be done with the introduction of a septic tank."—Houston, Texas.

"Privy vaults under the most favorable conditions should be abolished. There is no longer any excuse for not making use of proper plumbing appliances."—San Antonio, Texas.

"They are a necessary evil. Privy vaults are a constant source of danger and are rarely cleaned and disinfected and then only on the order of an inspector or the board of health."—Lowell, Mass.

"They are a menace to the health of the community, certain to contaminate the ground-water supply, unsightly and not conducive to civic beauty."—Indianapolis, Ind.

Privy vaults are the largest contributors to the pollution of streams, springs and wells, and the dangers arising therefrom are practically inestimable."—Schenectady, N. Y.

"They are the greatest disease-breeders that any city has to contend with and the sooner they are done away with the sooner contagion will be wiped out."—Davenport, Iowa.

"The yard closet is some improvement over the privy vault—both are a nuisance. Yard closets are a good-for-nothing plumbing fixture."—Milwaukee, Wis.

"There is nothing good to say of the privy. They should be prohibited in any city, town or village, and a modern system of house sewerage installed."—Reading, Pa.

"The privy vault is a menace to the public health under the very best construction."—Detroit, Mich.

"All privy vaults are dangerous and they should not be permitted."—Camden, N. J.

"Privies should not be allowed in any city where there is a sewerage system."—Canton, Ohio.

"The poorest form of a closet that can be constructed."—Columbus, Ohio.

"Cesspools are infinitely better than privy vaults."—Manchester, N. H.

"Foul smelling, disease-breeding holes."—Wilmington, Del.

"They are undesirable."—Bayonne, N. J.

"We consider privy vaults a nuisance,"—Joliet, Ill.

With yourselves as judges, I "rest" the case, knowing your verdict will be just and righteous, and, I hope, sanitary.

LOS ANGELES NOTES.

Los Angeles plumbers are figuring on work in the new Manual Training High School at that place and contracts for this work will be let this month.

Thos. Haverty Co., Los Angeles, has secured the contract for installing the plumbing, steam-heating, ventilating and fire protection systems in the new seven-story concrete theatre and office building on Broadway, erected by William Garland. Consideration, $10,250. Architects Morgan & Walls prepared the plans.

Robert Pollard, 512 Carondolet St., Los Angeles, has been awarded the contract for installing the plumbing system in a two-story brick residence, being erected for Dr. Bert Ellis, Ocean View St. Consideration $1,141.50. Architect A. B. Benton, 114 N. Spring St., prepared the plans.

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Copy and cuts for advertisements intended for a particular issue should reach the office of Domestic Engineering on Monday of the previous week if it is desired that a proof of the advertisement shall be submitted. New advertisements can be received up to noon of Monday of the week of issue, but no proof can be shown.

Entered as Second-Class Matter at the Post Office at Chicago, Illinois, Under Act of Congress of March 3, 1879.

Member of the Chicago Trade Press Association.
Member of the Federation of the Trade Press Associations of the United States.

SPECIAL NOTICE TO READERS.

Our readers are invited to send in articles on any topics covering sanitary interests as outlined above. Photographs and drawings with descriptions of special interest to plumbers and steam-fitters are welcomed. "Domestic Engineering" pays at space rates for all articles, notes, criticisms and news data so contributed.

REPORT OF COMMITTEE ON AIR-WASHERS.*

It is admitted that the purification of air is vital, and that the engineering connected therewith is most important and interesting. Ever since there have been any attempts made to ventilate buildings efforts have been made also to remove the impurities from the air admitted. With the congestion of population in cities and the burning of bituminous coal it has become even more important to cleanse the air. With the wide use of fans for ventilation and the accompanying high air inlet velocities, quantities of dust and soot are pulled in and unless arrested and disposed of they reach and pollute the ventilated apartments. Almost every conceivable type of apparatus for removing the dirt has been tried. It is highly desirable also to purify the air by removing objectionable gases and odors. Dry filters of wire and cloth are in use. To be permanently effective they must be cleaned continuously or they merely hold up the impurities so that they may contaminate more air, and very soon become so clogged that the free area is curtailed.

A cleaner of this type is now on the market, and consists of a series of wire screens, over the inlet side of which hollow slotted suction arms under a considerable vacuum are constantly rotated. The vacuum is induced by means of a small centrifugal exhauster and the screens, thus kept free from clogging are maintained at their highest efficiency. This type is very economical in operation, as it does not require any preliminary tempering coils, and the maintenance of the vacuum is a trifling expense. This cleaner does not affect the temperature or humidity of the air, and is therefore advantageous in many respects. It appears doubtful whether or not it will eliminate from the entering air all minute particles of dust, but has without question an efficiency high enough to justify its installation in many buildings.

Cheese-cloth bags in the air inlets to gravity indirect plants in even the residence sections of cities will often become black and so clogged that they become practically inoperative in twenty-four hours. However, if designed with ample free area, and changed every few hours, they are very effective in removing dirt and soot. The bag type seems to give the greatest free area in a given space of any cheese cloth cleaner. The bags should be made of inexpensive material and when removed should be burned.

There is a dry air-cleaner on the market which is composed of a sheet or belt of heavy special cloth, which is supported on zigzag frames and is so designed as to present a very large surface to the passage of air. The velocity through this substance must be very low and the space required renders it a difficult task to find room for its installation in ordinary cases, especially where air for ventilation is to be cleaned. This type is, however, especially adapted for filtering air used in manufacturing processes, on the suction inlets to air compressors, for cleaning the air used in cooling electrical machinery, or for cleaning the gas entering internal combustion engines. Notice is sure to be given, by greatly reduced air volume due to clogging, when this type requires cleaning. The thickness and mesh of the fabric are capable of considerable variation, to fit the special requirements of the installation.

Where expense of installation and maintenance is of

*Presented at the 16th annual meeting of the American Society of Heating and Ventilating Engineers, held in New York City, Jan. 18-20, 1910. This committee was composed of the following gentlemen: S. R. Lewis, chairman; Bert C. Davis, Thomas Barwick, R. P. Bolton, James Mackay. The report is reproduced here in excerpt form in accordance with the Society's rulings.

no importance as compared with results, filters of cotton fiber loosely held within wire frames are in use. The air-velocity is kept so low as to be almost imperceptible. The cotton is removed as it becomes soiled, by an attendant whose time is practically fully occupied by this duty. Such an installation must have a very high efficiency.

There are many types of air-cleaners which use water. When water is used over a screen of sufficiently fine mesh for the screen to be effective, the water closes the interstices in the screen and reduces the free area. Coke has been used, being held in trays of wire, with water running over the whole. The pores of the coke soon become clogged, and the whole mass becomes slimy and unspeakably foul, when it is a tedious and expensive task to remove it and refill the trays with new material. This type of cleaner also produces considerable resistance to the flow of the air. Various other expedients have been tried, such as ropes of fiber running as endless belts through a pan of water, the air being drawn between the dripping ropes. With such types there is apparently not enough impinging area, and, like the coke type, the maintenance cost is high.

Gradually there has developed a type of cleaner, in which the air is first drawn through a chamber in which it meets with a spray of water, then through a battery of baffle-plates which are so arranged that little if any of the water can pass. Many of the devices and processes of this type of cleaner are covered by patents.

To a large extent, we believe the principle which makes one effective makes all more or less effective. The baffle-plates may be vertical or horizontal, curved, angled or hooked, and in their construction lies the secret of the results attained. These water-cleaners if they would be economical must have pumps to recirculate the water, as the large quantities used would be expensive if handled but once. If the cleaner is effective, or if there is enough dirt in the air to make it worth while to run the cleaner, this water must be frequently renewed. The cost of running the circulating-pump is nominal. The process of securing an intimate contact between the air and water is very important, and there are many patented forms of spray heads and other devices for accomplishing this.

As at present manufactured by a number of firms, this water type of cleaner consists of—

First. A tempering-coil, which raises the temperature of the incoming air above the freezing point, or steam coils which heat the circulating water to such an extent that it will not be frozen. It is always advisable that these heaters be automatically controlled.

Second. A spray-chamber and tank built of copper, galvanized sheet-iron or concrete. In this chamber are spray-heads, perforated pipes, overflowing troughs or other devices for securing an intimate contact of the air with the circulating water. In some types the water merely falls from the ceilings; in other, is sprayed in thin sheets at right angles to the air current; in others, falls like rain over the edges of troughs at right angles to the air, or runs over coarse meshed screens.

In some the spray-heads open periodically and are automatically flushed out, and in others this flushing must be done manually from outside the chamber. In some, lamentably, it is necessary to shut down and go at each spray with a screw driver. Others are so built that they cannot possibly clog. One device combines the spray chambers with a fan wheel, using centrifugal force for mixing air and water and finally for separating them.

Third. An eliminator, built generally of galvanized iron or of copper. This seems to operate on the same principle as most steam separators in that by sudden changes of direction the air passes on, but the particles of moisture and accompanying dirt impinge on the wet surfaces and drain to the tank through channels provided for the purpose. The shape, size and general design of this part of all air-washers seems to be a crucial point. Part of this surface apparently should be passed by the air at high speed, so as to slap the particles of dirt against the wet plates. Part should be passed more slowly, so that as much of the moisture as possible may be deposited.

It seems not inappropriate here to insert some suggestions made by a prominent engineer as to improvement in the water type of air cleaner, as regards both its manufacture and installation. Nearly all the devices now made could be equipped to conform with these suggestions. The expense would be somewhat increased by porcelain enameled construction, but cleaning would be greatly facilitated, sanitary condition much improved, and everlasting construction attained.

"1. Proper spray-chambers, and eliminator-chambers, with walls of material impervious to moisture, readily cleaned by hand, the surface to be similar to the vitreous material used for plumbing fixtures.

"2. The eliminator vanes to be made of similar material and made easily removable for cleaning and repairs.

"3. Each spray chamber to be provided with artificial lighting apparatus, so that the operator may observe the condition of the chamber.

"4. The cleaning devices for spray-nozzles to be arranged so as to operate from the outside of the washer as readily as the try-cocks of a boiler are operated.

"5. The settling-tanks containing the water in the bottom of the air washers to be made of the same material as the walls of the spray-chambers, above described, so as to be easily flushed and cleaned.

"6. Each manufacturer to furnish directions on a metal plate, indicating to the operator the several duties to be performed in order to care for the apparatus properly.

"7. Manufacturers to furnish with every device a reliable dial thermometer (cost about $30) which will indicate the temperature of the spray chamber; also, a reliable dial thermometer which will indicate the temperature of the tempered air chamber, so that the operator can tell whether the automatic temperature control devices are maintaining the proper temperature in each respective chamber, without going into said chambers."

As the gentleman making these suggestions probably has installed as many air washers as any individual not a manufacturer of them, his suggestions should be given consideration.

Every eliminator baffle-plate ought to be accessible for cleaning at every joint and crevice. At present, apparently it is impossible thoroughly to scrub down the interior baffles of many makes. Some of the manufacturers have recognized this feature and provided easily removable baffles.

Perhaps one of the greatest fields of activity for water air cleaners or air-washers, is along the line of humidity control.

We quote from a paper read before the Brooklyn Medical Society by H. M. Smith, M. D., and printed in the Metal Worker in 1905:

"The prevailing practice of depending upon the thermometer as the sole guide in the heating of buildings is not only inadequate and unscientific, but is often misleading. It is not sufficient to know only the temperature if we desire either comfort or health, for the same temperature produces varying sensations of warmth or cold,

depending upon the relative humidity at the time existing. It is unscientific and arbitrary to lay down a fixed temperature as a standard for living or sleeping rooms unless the relative humidity is indicated as well.

"At New York and along the Atlantic Coast the prevailing winds during cold periods are usually from the north or northwest, having passed over a dry, frozen area, which has presented little opportunity for the air to take up moisture. At such times the temperature of the air indoors is allowed to become as high as 76 to 78 degrees in order to feel comfortably warm. Records from steam-heated apartments show that the relative humidity was sometimes as low as 26 per cent, with a temperature of 78 degrees, during a period of very cold weather in January, 1902. The high temperature is necessitated by the chilling of the body by the increased evaporation, evaporation being essentially a cooling process.

"It is needless to say how unhygienic as well as uncomfortable is such a distortion of the proper relationship between temperature and relative humidity. By regulating the indoor relative humidity, we could keep our room temperature much more nearly stationary, irrespective of the temperature outside. But no improvement in indoor atmospheric conditions can be expected until heating engineers and the people they serve realize that with the ever-varying absolute humidity out of doors no system of heating can be made satisfactory if the indoor relative humidity is disregarded. Even thermostatic temperature control will not fill the requirements, for a constant temperature is constant in its effects only if accompanied by a constant relative humidity.

"That we are wasting fuel is evident at once from the unnecessarily high temperature we maintain. The waste is probably greater than is generally supposed. W. M. Wilson in a paper delivered at Milwaukee in 1898 at the convention of weather bureau officials said that about 25 per cent. of the cost of heating is expended in raising the temperature from 60 to 70 degrees, so if we can keep comfortable at a temperature of 65 degrees we shall have saved at least 12½ per cent of the total cost of heating."

Some of these modern air-washers, with the various devices attached governing the temperature and volume of air and water, are able to maintain, automatically, any desired reasonable relation between temperature and humidity, day by day, season by season, and their field of usefulness along this line is, we believe, just begun.

HOW A SOUTHERN MASTER PLUMBER GIVES HIS "KICKING" CUSTOMERS AN OBJECT LESSON.

W. H. Barnard, of the plumbing firm of W. H. Barnard & Co., Norfolk, Va., has recently gotten out a circular entitled "A Suggestion", which his firm sends to "kicking" customers whenever an occasion arises which calls for drastic treatment. The circular is replete with common sense and contains so many well-taken points that we cannot refrain from reprinting it in full for the benefit of those among our readers who occasionally have to deal with knockers:

A Suggestion.

"John Doe & Co. keep a very handy shop. They employ workmen—steady, faithful men—and every effort is made to serve their customers promptly. When cold weather comes, or maybe moving day, the citizens generally know that John Doe & Co. are pretty prompt people when something is urgently wanted to be done. Maybe the range-boiler has sprung a leak. Maybe the sewer has become stopped, and in consequence the plumbing fixtures cannot be used. Maybe a range must be set up to get supper on. No matter what it is, 'Telephone to John Doe & Co. and have them send right up and attend to it.' 'Ting-a-ling, ting-a-ling,' the telephone rings, and Mr. Doe answers, 'This is Doe & Co.; what is the matter?' The answer comes, 'Send a plumber at once; we must have so and so done at once; it's an urgent job and must be done'!

"John Doe communicates with his foreman, who says: 'Say, I can't send today, unless I stop a man on a job that he is doing for some one else'. 'Can't help it', says the boss. 'This customer depends upon us and must have his job done tonight'. Consequently the workman is temporarily taken off the 'other' job and his melted lead or solder gets cold; he lays this job aside and is hurried off to serve the other customer. He goes over to the other house (probably three miles away) to see what is wanted and finds that a little piece of pipe—probably 4⅜ in. long—is wanted. He comes back to the shop again (three miles more) to cut it out, and he returns with it (three miles more) and fixes the job, cozy and nice, and returns to the shop again (three miles), making a total of twelve miles, and gives in his charge.

"He then returns to his former job, starts his fire again, and possibly in a half hour after he returns he again has his lead melted and commences on his other job where he left off; and in so doing he loses a half hour, uses more fuel, etc. But whose loss is this? The boss's, of course; because had he not been so accommodating he would not have stopped the man on his job to serve the customer. The boss has done a job for the customer that has been of great comfort to him. He has put up the stove late in the day, and the customer's family can have a good hot supper on account of John Doe & Co.'s attention to their customer's needs. Does the customer appreciate this? Let's see!

"After a while John Doe sends his bill in for the job. It is $5. It is true that Doe made $2.50, but what does the customer say? 'Why, Mr. Doe, this is robbery! Your man did not take more than fifteen minutes on this job, and I want you to look over your bill and render me a bill for what the job ought to cost (according to my ideas) and I will pay it'. John Doe generally takes the bill and says to himself: 'Robbery! My customer says that I have tried to rob him'! That's what Doe & Co. get for trying to help some one out of trouble! Why, if the whole $5 was profit the customer should have paid it and said: 'The comfort to me is well worth the price'. But, unfortunately, many good men continue to forget their honor, and poor John Doe gets it in the neck from many men who ought to pay their little bills in full, and if John Doe has not been faithful, pay him—but deal elsewhere next time.

"Motto: Don't get a man's merchandise or service and then set your price on it."

WISCONSIN NOTES.

The Associated Plumbing & Heating Co., Milwaukee, Wis., has been incorporated with a capital of $5,000. The incorporators are Edward Considine, Edward M. Pripps and Frank Robinson.

Cavanaugh & Smith, a well known plumbing and heating concern at LaCrosse, Wis., has dissolved partnership. P. F. Cavanaugh has disposed of his interest to Otto Ratz and Otto Marquardt, who will be associated with Charles Smith in continuing the business.

The McCoy-Nolan Heater & Supply Co., Milwaukee, Wis., has been incorporated with a capital of $10,000. The incorporators are Frank E. Nolan, J. R. McCoy and G. C. Dutcher.

R. Anderson has reopened his plumbing business at 1002 Pierce Ave., Marinette, Wis.

Business Management

New Methods for Old

A NEW DEPARTMENT.

Editorial Comment.

As stated in a previous editorial we were greatly crowded in the "Questions and Answers" department, and upon looking the ground over ca efully we have decided to open up a new department for the benefit of our many readers who are so greatly interested.

A glance at the contents of this department will enable our readers to see for themselves where the dividing line has been drawn. We have many inquiries of various kinds which do not, properly, belong in the department of "Questions and Answers" which we desire to apply more strictly to the mechanical part of the craft, and by opening up this department we hope to afford an outlet for these different ideas. Our readers are invited to send in communications and are requested to make them frequently, as it will depend entirely upon the amount of interest manifested as to whether or not this department is continued.

WHO CAN GIVE THE INFORMATION?

Editor "Domestic Engineering":—A long time ago I discovered in a daily newspaper, a Philadelphia paper, I think, an advertisement of a plumber who installs complete bathroom outfits on the club or installment plan. I would like to know more about that plan and its workings, but have lost or mislaid the address of the plumber referred to, and so am writing to ask if this particular selling plan has ever come to your notice, and what you know about it.

J. A. K.

We publish this communication for the purpose of calling attention to the idea and obtaining some opinions from our readers upon the feasibility of the idea. We state that, at present, we have been unable to locate any such plan, and would be glad to hear from any of our correspondents down east who have any information.

REGARDING HEATING LICENSES.

Editor "Domestic Engineering":—I fail to see much reference to heating licenses in any of the publications. Now I believe that a fitter should be required to take out a license just as well as a plumber. I can see no reason why any such favoritism should be shown as there is at present in nearly every state in the country.

It looks to me as though there should be some kind of a state or county-board to pass upon such heating matters, for I believe that an ignorant steamfitter can do nearly as much harm as an incompetent plumber. I wish that you would publish this letter as some one else may have ideas upon this subject, and it is a question that demands the attention of the craft at large.

Louisville, Ky. "Kentucky".

We comply with our correspondent's request and should be very glad to receive communications upon this subject which should be of interest to both masters and journeymen all over the country, and at times as the occasion demands may have some words to say upon the subject which will be of interest to our readers.

HOW ABOUT "MAKING GOOD" THE MISTAKES?

Editor "Domestic Engineering":—Should a steamfitter or plumber be required to make good on his own time any defect, mistake, oversight or damage on the job for which he may be responsible?

Brooklyn, N. Y. "Little Jimmy."

This is a question which may be viewed from two sides of the fence and there are good points on both sides. We have turned the question over to Mr. Phoenix, as we believe that his experience should enable him to submit some good ideas upon the subject, and he writes:

"Of all the shops I ever worked for two only enforced the rule of making a man make good his mistakes upon his own time; or paying for fixtures or material which he accidentally spoiled. I can state that in both these shops the tools might have been far better than they were and that, with two exceptions, the journeymen did not stay very long with either shop. I am simply stating facts now, and will leave the chance open for others to express both facts and opinions."

WHO MAKES THIS DEVICE?

Editor "Domestic Engineering":—Will you kindly tell me who manufactures a device to be placed on the drainage system in the basement of hospitals and other public buildings for the purpose of intercepting pieces of cloth, absorbent cotton and material of a similar nature? I am told that this device is made in such a way that it can readily be opened and cleaned regularly without much trouble, and also without allowing sewer-gas to enter into such buildings.

Chicago. F. A.

We regret that we are unable to give our reader this information, but trust that some of our many readers will come to our assistance.

"FIGURING A HEATING JOB."

By Phoenix.

A short time ago a party wrote to me and wanted to know if I could give him a reliable elastic system for figuring heating work, one that could be expanded or contracted, as the case might require, and that would cover two, three and four-story jobs and still get results.

To this question I replied that the nearest thing of the kind I ever saw was a man who could lump these things in his head. He had been in the business a great many years and would go into a room and, glancing around, in nine times out of ten, be able to tell, without figuring, how many feet it would take to heat the room.

This, however, does not cover the entire job by a great deal, for there are many other things which must be figured besides the radiation. I am aware that there are various short-cuts, some of which have merit, but the only short-cut I know of which will cover the whole job is to figure the plant by the foot. In order to do this one must know two things accurately.

First: How many feet of radiation the job requires.

Second: One must be dead sure of the price per foot at which he can install the radiation at a profit.

This can be found by figuring over your work for the past year and striking a fair average price per foot. However, this way of estimating is more or less of a "gamble" with fate, as there are many chances for one to fall down. The labor may consume much more time than was set down in the general average. The boiler may crack or some radiators may go wrong.

Again the boiler may not fit the cellar. On one such snap judgment I remember the boiler turned out to be too high and it was necessary to drop it a couple of feet. This required tearing into the cellar bottom which was cemented and when the pit was made it was found that the contractor had dropped about thirty-six dollars on which he did not figure.

Years ago when we sat upon the hard benches at the cross-roads school the stearn-faced teacher exclaimed with raven-like voice: "There is no royal road to learning." Truly the path was difficult and I don't remember that he, or she, as the case happened to be, made it very much easier.

Likewise one might exclaim that there is no accurate, easy road to complete estimating. There are certain systematic lines which one may follow that will render the work much more accurate and by getting certain things "well set" in one's head, the estimating can be performed much quicker, but as for some system which will expand and contract, and perform nine-tenths of the work itself why I have never yet run up against one.

Now, if I were getting out a new estimate-sheet—and there are many meritorious ones for sale—I believe that I would divide it into three different sections, such as: Section I, the cellar; section II, various floors; section III, items.

It would not be necessary to print the words cellar, etc., in the estimate, but the items could be so divided.

I consider the advantages of this plan to be as follows: The boiler, pipe and fittings would all be figured together—in running up the mains and branches you would have the distance by sizes and these same figures could be used for estimating the amount of pipe-covering, thus saving the time of measuring the job twice.

It takes but a moment's time to run up the risers and that amount could be set down with the rest of the pipe.

When we come to the second and third floors we would have the cubical contents of rooms and the radiation, air-valves and radiator-valves. I see no reason why they should not be listed at this place as well as any other. The head "items" would of course cover the labor, freight, board, profits, etc.

I have never observed an estimate sheet made out in exactly this form, yet I consider it fully as easy and showing more common sense than tracing these matters out in some other fashion. In figuring the job out from such an estimate one would begin with the cubical contents first.

Right here is the tedious part of the game, but if one has some practice the figures come easy after a while.

When the cubical contents, exposed walls and glass surfaces are known one can get at the amount of radiation, and there are various accurate simple rules, which have been published in "Domestic Engineering" several times during the past year, which are almost, if not entirely, indispensable. I refer principally, however, to the 55ths rule which I will repeat here in order to save extra questions. This rule, used with common sense and an appreciation of its advantages, is a mighty good one to follow and should be cut out and pasted up in some safe and convenient place. Here it is:

$$\frac{\text{C. C.}}{2/55} + \text{Glass} + \frac{\text{Exp. Wall (—Glass)}}{4} \div 4 = \text{Steam Radiation.}$$

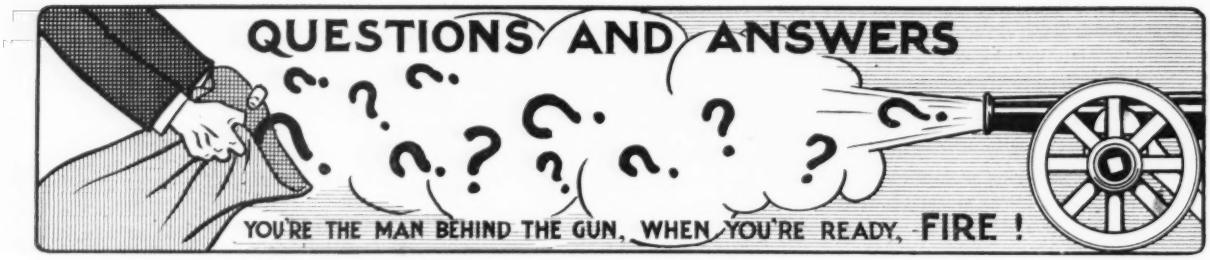
This rule has been explained several times in the past year and I shall not tarry here to do so again. When the radiation is known the boiler and pipe sizes can be determined. Here is a short easy rule, not original, for the size of the main. The square of the diameter of a pipe, multiplied by 100 will give the amount of radiation the pipe will carry. Thus, how much radiation will a 2-in. pipe carry? Square the diameter—$2 \times 2 = 4$. Multiply this by 100 and you get 400. Therefore, under ordinary circumstances a 2-in. pipe should take care of 400 ft. of steam radiation, should the main not be over 100 feet long.

This matter was investigated by the American Society of Heating and Ventilating Engineers and I notice that from the results of fifteen answers they reported 400 feet as the highest amount permissible on 2-in. pipe and 286 ft. the lowest, while an average amount was stated as 335. One must remember, however, that conditions differ so much in various installations that these variations may be accounted for in actual practice.

After the amount and cost of the material for the job is found, under the head of "items" the labor, bronzing, freight, board, car fare, temporary use, per cent for running expenses, profit and miscellaneous, can be figured and the cost of the job found. Now there is a question here of how to figure the labor. Some do it by figuring that a man will (or should) set a certain number of radiators per day. This is not accurate. On some jobs a man may average anywhere from two to five radiators per day. On others it may bother him to set one radiator each day. The best answer I can give to the labor end of it is this: Know your men, treat them "on the square" and they will do all they can for you. Their good-will is a distinct asset to your business.

TWO ASSISTANT PLUMBING INSPECTORS APPOINTED.

The appointments of Harry C. Kirkpatrick and W. P. Coakley to be assistant plumbing inspectors at Kansas City, Mo., were confirmed by the city council last week. The positions were created by the new plumbing ordinance which requires plumbers to be examined and licensed.



WHY DID THIS BOILER CRACK?

Editor, "Domestic Engineering":—I have a section cast-iron steam boiler with some of the sections cracked. When I was called to look at this boiler there was water in the glass. I opened the pet-cock under the water-gage and the water ran from the water column and came back in the glass about one-third the way up. The party had a light fire in the boiler at the time.

What I would like to know is, if there is any reason why the water should show in the glass, when there is no water in the boiler? The party claims that water has never been out of the glass and the sections are now cracked. If you could throw any light on this question I would be very much obliged.

Albany, N. Y. F. N.

Our correspondent states that the water came back into the glass after he had emptied it. From this it would seem that there was water in the boiler at that time.

Perhaps the feed may have been turned on. We do not see how the sections could have cracked if the water had always been in the boiler in sufficient quantity, unless the boiler was "cinched" up too tightly, in which case the sections of the boiler would have cracked when the boiler was first fired up, or shortly after.

From the circumstances, as given, we should be inclined to believe that the boiler had not always had enough water and that cold water had been admitted at the wrong time.

SOME COMMENTS BY A READER.

Editor, "Domestic Engineering":—Several months ago there appeared an article in your paper advocating separate inlets into soil lines for each fixture, if possible, and a cast-iron bend connection for the water closet. It also cited an instance of a remodeling job in Chicago, where a branch connection into a lead bend had ripped the lead bend at the branch, due to expansion and contraction. While I favor separate soil-connections, I believe this work would have been in good condition today, if the branch lines had been properly braced and brass caulking ferrules used in place of combination caulking ferrules. Is there any good mechanical or sanitary reason in favor of combination ferrules? There is no chance for a break for work properly installed and in most instances when such work falls down, the cause is really rush work. One mistake the plumbing trade publications make, is referring more in their news items to the quantity of a man's contracts instead of quality.

Monaco, Pa. Seg.

We are pleased to hear from our friend and note that he is studying different conditions in the craft. We refer, many times in our news items to the number of jobs such and such an individual may have on hand. It would not be possible in such a reference to go into details of the jobs as lack of space prevents. At various times we publish full accounts of special installations and in such cases desire to get in all the information we can.

We are always willing to be "shown" however and if "Seg" can tell us how in four or five lines we can list from six to eight jobs and describe their qualities we are willing to endeavor to grasp the idea.

WHAT IS THE TROUBLE HERE?

Editor "Domestic Engineering": Herewith you will find a sketch of waste pipe for basin and fountain-cuspidor (Fig. 1). This job has given us some trouble with gurgling in the waste pipe from the basin, which is very

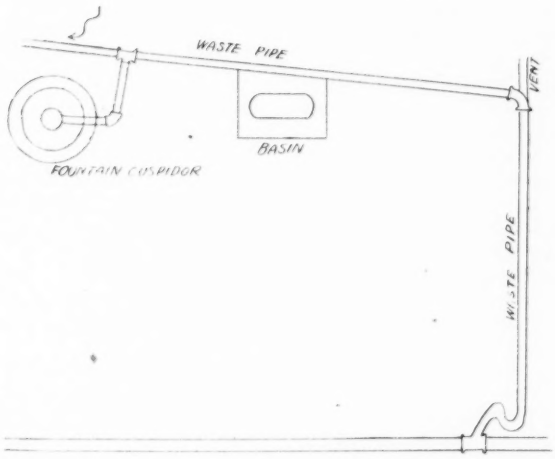


Fig. 1. Sketch of Gurgling Waste Pipe.

unpleasant. It will be greatly appreciated if you will give us some light on how we can overcome this trouble.

Staunton, W. Va. T. L. G.

It is possible that the waste or some portion of the line is partially stopped up and the water thus does not pass off freely. Would suggest that the vent is not located in the right place, as shown in this sketch, but should be placed somewhere beyond the cuspidor, as indicated by arrow in sketch.

POINTERS ON PIPE SIZES.

Editor "Domestic Engineering":—On page 254 of your December 4th issue in answering an inquiry regarding sizes of flow and return steam mains you refer to the book of replies to my inquiry regarding this matter and give one of the lowest estimates found in the book—namely, "one sq. in. area in cross section of pipe for each 100 ft. of direct radiation." Such a pipe is entirely too small, experience has taught me; 1½ sq. in. area might answer except in long runs around basement where larger pipe should be used and the size continued until the last radiator is fed and the drop to a wet return occurs. Here

an automatic air-valve must be placed. Such a plant works quickly, is noiseless, the water-line in return pipe holds very near to water-line at boiler and no water trouble in radiators or in leaving boiler through flow-pipe is experienced. Place plenty of radiators to heat the building in ordinary weather with one pound or less of steam, check the fire and burn coal as slowly as possible. Here in Minnesota where hard coal costs $10 per ton we study economy in constructing plants. Large pipe we dread, as it is hard work with the dies; nevertheless, to use them means success for the fitter and saving for the owner.

Yours fraternally,

Geo. H. Claggett, Mayor.

Montevideo, Minn.

We publish with pleasure the above letter from Geo. H. Claggett. When the writer of these lines met Mr. Claggett about three years ago, Mr. Claggett was not mayor, if our memory serves us correctly. We are mighty glad to see a plumbing and heating man coming to the front and making the business felt in the community, and we know of none more worthy to hold such honors than our friend G. C., but I want to state right here that he is very partial to running pipe sizes big. Now, G. C. has put in many good jobs in his town and vicinity. The writer knows this to be an absolute fact from personal observation. Coal is expensive up in that country, that I know from experience, having wintered several seasons in the Northwest. I want to state, however, that G. C. wants to consider the fact that there are different practices and different climates in the United States.

Now, what would he think of putting 120 feet of hot-water radiation on a 1-in. supply and return-pipe, and, at that, having to "smother" it to a three-quarter supply and return, because the radiator furnished too much heat?

WHAT IS SEWER-GAS?

Editor "Domestic Engineering":—In a recent issue of your journal the question "What is sewer-gas?" was asked by a correspondent, and it was answered by Mr. Phoenix as follows: "There is no such a thing!" Mr. Phoenix quoting the now well-worn statement relating to the bacteriological contents of sewer-air from the National Association of Master Plumbers' Sanitary committee report in support of this very broad statement.

I would respectfully call attention to the fact, that the question asked was not: "Does sewer-air contain bacteria harmful to health?" but it was, "What is sewer-gas?" Quite a different proposition.

Briefly stated without technical terms, sewer-gas is the gaseous product of the decomposition of vegetable and animal matter contained in excreta of human beings and in kitchen-slops and refuse that is rightly or wrongly, dumped into the closets and waste-pipes, finding its way thence into the house-drain and sewer.

There have been at numerous times different chemical analysis made of such gases, the principal gases that were identified in most specimens examined being carbonic-acid gas and sulfid hydrogen, the latter being easily recognized by its odor which is akin to antique eggs of a very rich vintage. The carbonic-acid gas is attributed to a withdrawal of oxygen due to a chemical combustion in the process of putrefaction. "Small doses of these gases, especially if continued over long intervals of time, may produce less obvious but yet important derangement of the vital functions, languor, headache, nervousness, loss of appetite, diarrhoea, and even vomiting have been attributed to the odor of putrid gases" (Report of Sanitary Committee, Page 5).

The effect of sewer-gas is obvious in certain cases so far as large doses are concerned.

The file of any newspaper covering a period of several years will bring to light authentic cases of sewer-gas poisoning of sewer-laborers in different parts of the country.

The question of the effect of such amounts as are ordinarily contained in the sewer-air of a house-plumbing system is, however, up to the present, debatable ground, which it will require scientific and verified data to establish.

Some persons seem immune while others are highly susceptible to its influence.

Physically considered sewer-gas is said to be explosive in concentrated forms. I remember very vividly tapping a two-in. soil-pipe line (that was inverted) for the purpose of cleaning, and when I held a candle to the hole to examine the contents, there was a blinding flash which singed my beard and eyebrows. There may of course have been a leakage of illuminating-gas into the sewer through the earth and thence into the 2-in. soil line. This hypothesis is, however, negligible by the fact of the stoppage being between the street sewer and the point of explosion and by the fact that the line was unventilated. It seems therefore to have been an explosive product of a gaseous nature due to decomposition of the contents of the pipe.

Another instance is related by a fellow plumber, whose veracity I have no reason to doubt.

He was sent to ascertain the cause of an apparent periodical backing of the waste from a basin into a closet. He found an old-time pan closet set on 4-in. lead trap with untrapped basin-waste entering the 4-in. trap (the job was unventilated in any form, the 4-in. trap being the end of the 4-in. soil line.) After studying the run of piping he concluded that the main-stack became air-bound at times. He inserted the point of his penknife into the heel of the trap near the crown holding a lighted candle in his left hand. A tiny blue flame at once started to burn at the slight opening, burning for about two minutes and then peetered out. After venting the job by a 2-in. air line to roof having been inserted at the crown of trap, the trouble of periodical backing did not re-occur.

Unquestionably some of the things emptied by householders into the waste-pipes, such as discarded medicines and refuse of medicine cabinets may and do often contain chemicals that of themselves evolve various gases, when dissolved. These are, of course, momentary local conditions, and are not sewer-gas. Also leakage of illuminating-gas from street mains into sewers, and refuse from manufacturies cause gaseous emanations which are not sewer-gas. But in neither of the quoted cases did there seem to be any such local conditions to explain the phenomena of sewer-gas burning.

The fact is, that there is a well-identified product called sewer-gas, but of its positive physical, physiological and pathogenic effects we are all, as it were, in ignorance.

Newark, N. J. H. F. Baillet.

WHO HAS A GOOD STOCK-SHEET?

Editor "Domestic Engineering":—We are trying to get up a good stock-sheet and upon reading your magazine of Dec. 4, 1909, observed a sketch of a plumbing estimate which looked very good. Perhaps you can assist us further.

Milwaukee, Wis. N. H.

We publish this letter and would ask that some of our readers kindy send in forms or suggestions. We should

prefer getting forms which have been found to be successful by actual experience of two or three seasons' work.

WHY THE COIL REVERSES.

Editor "Domestic Engineering":—Having read your paper as it came to the shop, I was forced to laugh at the different ways some of my brother mechanics have installed work, but remained silent as I thought it was meant for the employer and not the employee. However, I take the liberty to give my theory on "Why the Coil Reverses" in Fig. 2, page 123, Jan. 29, 1910.

After it has stood for quite a while and is very hot, (the gas-range coil being the hottest) some one draws hot water from the system which starts a fast circulation to the top of the boiler through the gas-range coil. Having already a circulation from the tee at the bottom of the boiler to the gas range and the water in the furnace coil being hot as soon as released, this will start a circulation from the bottom of the coil in the furnace past the bottom of the boiler and through the gas-range coil.

This trouble can be stopped by putting a deep trap where his draw-off cock is, or a check, but the check is

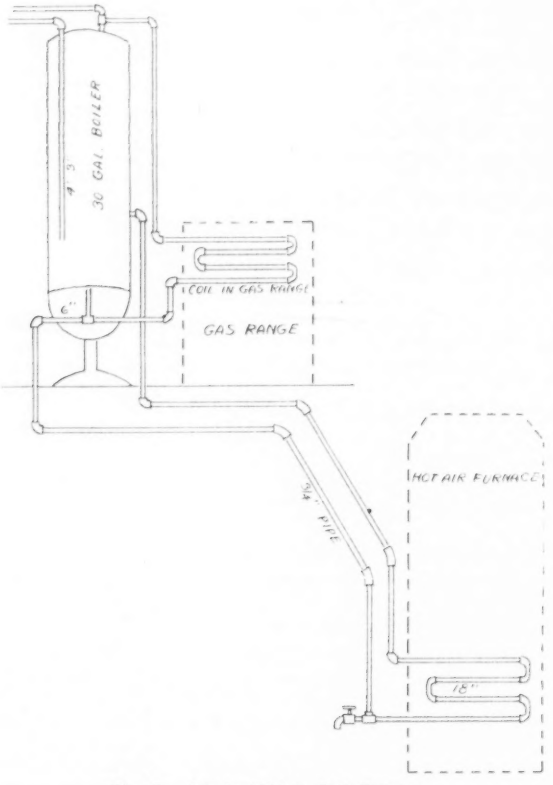


Fig. 2. Job in Which Coil Reverses.

not advisable. If "Westerner" wishes to change the job, I will show him how to connect the coils to the boiler so that they will work silently, never reverse no matter which has the fire, and it will cost less to install than his present installation.

Hoping this passes the waste basket, I remain,

Catonsville, Md. A Journeyman Plumber.

Editor of "Domestic Engineering":—Referring to the problem in your issue of January 29th, "Why Does the Coil Reverse Itself?" I would like to make the remark that the only queer thing about it is that it should ever go at all the way it was meant to go. It never would only for the greater or smaller intensity of the fire in the furnace. If you will trace what is supposed to be the return pipe from the bottom of the coil in the gas-range you will find a continuous connection to the top of the boiler, then follow the flow-pipe from where it enters the side of the boiler, and connects with the top 3 feet or more below where the return pipe enters the top of the boiler almost at the point where the cold water enters the boiler. To make the thing go right all the time take out the two elbows, the first one on the flow-pipe from range-coil and the one turning into the side of the boiler and put in a tee, or you may put in two tees and let the flow enter at both points. If this is done there will be no more reversing.

Eastoner.

SUGGESTS ANOTHER REMEDY FOR REVERSING COIL.

Editor "Domestic Engineering":—Referring to the question on page 123 of your January 29th issue showing a furnace and gas-range connection to a range boiler (see Fig. 2) denoting the water circulating the wrong way in the furnace coil or circulating pipes, the writer can see a number of different actions of the circulation under different conditions of the fire under coils, but the change which I think will meet with approval and give the desired result can readily be suggested.

In the first place the circulation in a system of this kind is caused by the difference in the temperature of water in the flow and return pipes, which is very slight. Note what will take place if you open the cock at the furnace coil and the boiler partly heated. The water will flow from top and bottom of boiler owing to the location of the tee beneath the boiler, thus heating the return pipe to furnace; note the flow of water from side of boiler passing through the flow pipe from furnace, cooling it. The return to furnace coil is now heated and the flow from furnace coil is cooled; then close the cock at the furnace coil and the water will circulate the wrong way as long as there is sufficient heat in furnace to heat the water.

I would suggest the following to prevent the action in question. Place the tee under boiler to a vertical position, leaving connection to range as shown; change the tee at cock to a vertical position, also connect the flow from the furnace and range together and enter at side or at top of boiler, leaving the most direct run from top of boiler to furnace coil; or probably a better way would be to place a cross at the side of the boiler where the flow from the furnace enters and extend the pipe from top of cross to top of boiler, and connect the flow from range into the side of the cross.

Homestead, Pa. Easterner.

HOW TO DISTINGUISH WROUGHT IRON FROM STEEL.

A writer in the Brass World gives the following formula for a solution for making an acid test to distinguish wrought iron from steel: Water, 9 parts; sulphuric acid, 3 parts; muriatic acid, 1 part. These acids are poured into the water and allowed to cool in a glass or porcelain dish. The test is made by immersing the samples in the solution for 15 or 20 minutes. After being rinsed and dried, the specimens, if iron, will show a series of fibers, with the slag interspersed between the fibers. Soft steel dissolves uniformly and without the fibrous structure found in wrought iron.

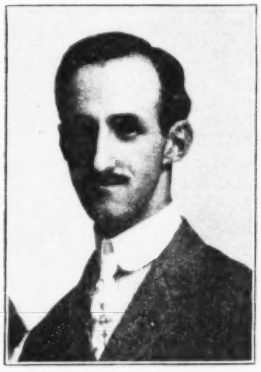
Among the Wholesalers

WILL MAKE HEATING BOILERS.

The Hart Heater Co., Oakland, Cal., has been incorporated with a capital of $50,000 to manufacture heating boilers. The incorporators are Charles Hart, P. L. Sternberg, and C. W. Keith, all of Oakland.

NOW WITH THE UNITED STATES RADIATOR CO.

Chas. A. Barker has accepted a position in the sales department of the United States Radiator Co.'s Chicago branch. Mr. Barker was formerly an architect representative for the Holland Radiator Co. up to the date of its sale to the American Radiator Co., consequently he has a wide acquaintance among Chicago architects on whom he will continue to call as a part of his new duties. He will also talk "Triton quality" to Chicago heating contractors, under the guidance of E. E. McNair, Chicago branch manager of the United States Radiator Co., Dunkirk, N. Y.



CHAS. A. BARKER.

WILL MANUFACTURE PLUMBING SPECIALTIES.

The Sanitary Fixtures Co., St. Louis, Mo., has been incorporated with capital stock of $25,000 to manufacture plumbing specialties. The incorporators are Allen R. Gilmore, L. M. Gilmore and Harry H. Engeling. The company has established temporary offices in room 1312 Third National Bank Bldg.

BOSTON PLUMBING SALESMEN'S FIFTH ANNUAL BANQUET.

About twenty members of the Boston Plumbing Traveling Salesmen's Association gathered at the American House, Saturday evening, February 5th, for the fifth annual meeting and banquet of the association. They gathered soon after six o'clock and for the greater part of an hour enjoyed an informal reception and general good time. At seven o'clock the party gathered about the banquet board and for three hours jollity reigned.

President Frank E. Eaton presided and after every one had eaten his fill called the business meeting to order, at which the following officers were elected for 1910: President, Joseph A. Maynard, of the F. W. Webb Mfg. Co.; first vice-president, Bernard J. Stokes, of W. B. Hubbard & Sons Co.; second vice-president, R. J. Sherriff, of James Barrett Mfg. Co.; third vice-president, H. P. Chadbourne, of John Douglas Co.; secretary and treasurer, H. W. Hunt, of Braman-Dow Co.

Following the election the members joined in a general discussion of the advisability of forming a permanent organization to take the place of the present social organization. Under the present constitution the only object of the association is to meet twice a year, once about the banquet board and once for a midsummer outing, and the only responsibilities are to see that the expenses of these two good times are paid. It was suggested at the meeting Saturday that regular dues be charged and that an effort be made to interest all of the plumbing salesmen in Boston and suburbs.

It was finally voted to allow President Maynard to name one man from each of the big houses in Boston to canvass the salesmen and attempt to secure them as members of the association. In this way it is hoped to reach every salesman in the line traveling out of Boston.

Among those who participated in the discussion were Bernard J. Stokes, Vernon J. Voye, R. J. Sherriff, Archie E. Campbell, Joseph Maynard, John Hartigan and H. P. Chadbourne.

The retiring president, Frank S. Eaton, in his farewell address spoke in favor of the permanent organization and told of the good which he believed it would do the men.

Among those present at the banquet were the following salesmen: H. P. Chadbourne, of the John Douglas Co.; Frank S. Eaton, of the Dalton-Ingersoll Co.; Sterling Jones, J. A. McAuliffe, B. J. Stokes, W. H. Kelley, and George C. Cummings, of the W. B. Hubbard & Sons Co.; George W. Durkee and W P. Glennon, of the Thompson Durkee Co.; George E. Bricault and Vernon J. Voye, of the Brown-Wales Co.; Archie E. Campbell, of William H. Gallison Co.; John J. Hartigan, of Crane Co.; H. W. Hunt, of Braman-Dow Co.; Joseph A. Maynard, of the F. W. Webb Mfg. Co.; J. C. McAllister, of Abendroth Brothers.

THE IDEAL MFG. CO. ARRANGES TO COVER LARGE TERRITORY.

The Ideal Manufacturing Co., Detroit, Mich., manufacturers of plumbing supplies and specialties, has assigned its sales force to cover the territories indicated in the following list: L. K. Markey will act as general sales manager; Chas. F. Cooper will cover Illinois, Iowa and western Indiana; Frank S. Crumley, Wm. Haggerty and Walter E. Hempel, the city of Detroit; Eph. Doherty, jr., Missouri, Kansas, Oklahoma and Arkansas; J. F. Gibson, Ohio and eastern Indiana; F. J. Kuhnhenn, city of Cleveland; E. G. Pond, Michigan; H. P. Thompson, New York state and Pennsylvania; Geo. S Schwartz, Wisconsin and Minnesota; M. A. Villeneuve, Canada; Hirschfield & Mayer, of Boston, will look after the company's interest in the New England States; G. E. Griffith will take care of Vancouver; and Joseph H. Leonard will cover Winnipeg. The officers of the Ideal Mfg. Co. are: President, James N. Wright; vice-president and general manager, James W. Dwyer; treasurer, John H. Rissell; secretary, James P. Feely, jr.

THE PUBLICITY COMMITTEE OF THE A. S. H. V. E.

The American Society of Heating and Ventilating Engineers has recently taken a broad and epoch-making position in appointing a committee of publicity. This committee is made up of one member in each state, and the function of the committee is to work for the improvement of the public health and happiness by spreading the gospel of ventilation. The intention is to secure the publication of information and data pertaining to this subject, to co-operate with other organizations, to improve living conditions, to furnish information regarding ventilation to boards of health or newspapers when desired, and in other ways which may appear later to educate the public to a realization of the benefits of proper air sanitation. The American Society of Heating and Ventilating Engineers has about 350 members, and has, through its efficient committee work, been of great aid in securing compulsory ventilation laws in at least five states, and has caused the introduction of bills for compulsory ventilation in many more states. Its membership includes the designers of the heating and ventilating apparatus of nearly all of our largest and finest buildings, and the designers of the heating and ventilating apparatus of perhaps 90 per cent of all of the schools in this country. The aid of the publicity committee is extended freely to all who may be endeavoring to secure proper ventilation of any buildings, and any one can get in touch with it by writing the secretary of the society, W. M. Mackay, P. O. Box 1818, New York, N. Y.

PERSONAL MENTION.

Fred K. Dibley, manager of the Denver branch of the L. Wolff Mfg. Co., was in Chicago last week, and visited the general offices of the Wolff company.

Wm. T. Morgan, vice-president and general manager of the Raymond Lead Co., Chicago, left this week on an extended pleasure trip through the South and to Havana and other West India points.

The Metal Market

THE PIG IRON TRADE.

Several important contracts have come to the surface in the last week, but on the whole there is a tendency toward lower prices. The principal business was for foundry and forge iron for Eastern Pennsylvania melters. The General Electric Co. closed contracts for nearly 10,000 tons of silicon irons and high phosphorous irons for shipment to its Lynn and Pittsfield plants. Some of this business was taken by the Buffalo furnaces, although a portion went to Virginia stacks. Pending contracts included some business for the last half of the year, but for this consumers are insisting on securing lower quotations. No important contracts, however, for this business have come to the surface. Basic in Eastern Pennsylvania is 25 cents a ton off. In the Pittsburg district it is 50 cents a ton lower than the first of the year. Quotations are as follows:

Northern Foundry No. 1X	$18.50 to $19.00
Northern Foundry No. 2X	18.25 to 18.50
Southern Foundry No. 1	18.75
Southern Foundry No. 2	18.25

THE COPPER MARKET.

The markets are undeniably weaker. Actual sales are reported at 13⅝ cents cash New York for electrolytic. Lake is likewise easier and can be had without any trouble at 13¾ cents. Some talk has been heard that as low as 13½ cents for electrolytic could be done, but no such figures have been quoted. The unfavorable feature of the copper market which is apparent to all large consumers is the fact that shipments into America are extremely large. During the year 1909 they aggregated 145,000 tons, compared with 97,000 tons the year previous. An increase of 50 per cent in imports with a constantly increasing domestic production and almost stationary consumption will lead to one inevitable result—that is, stocks will increase. They will not increase in America, for the simple reason that America's selling agents are shipping the copper to Europe. In January 26,000 tons went—at the rate of over 300,000 tons a year.

Stock market gyrations have predominated in the copper market this week. The Guggenheim interests are evidently not going to have the smooth sailing with their copper merger that they had planned and the $750,000 lawyer's fee may take a lawyer to collect. The movement evidently was concentrated against the copper stocks and of course with such a tremendous liquidation in securities there was no actual business in copper.

THE LEAD MARKET SITUATION.

The lead market has been stationary, little business being transacted, although there was a decline in St. Louis last week. The American Smelting & Refining Co. continues to quote, shipment lead, at $4.70, but there is no business. Outside interests are asking $4.72½. In a retail way lead is quoted, nominally, at $5.50 per 100 lb.

PIG TIN SEEMINGLY ERRATIC.

A highly unfavorable statistical report was issued last week, and in the face of this tin advances. This makes the manipulation of the last six weeks all the more apparent. As it is, there is more tin in sight than any time since 1898, and today the price is about twice as high as then. The London operators have the tactic assistance of the United States Steel Corporation, as this interest has about 6,000 tons of tin bought. Whether they will be able to hold the price in the face of these unfavorable returns is more or less of a problem. If consumption decreases and production increases at its present rate, prices will have to recede. Tin is easier this week and for five-ton lots can be had at 32 cents. Small lots are quoted at 34 cents.

IRON MARKET SHOWS GREAT ACTIVITY.

January was a month of heavy sales and February begins auspiciously. The new business booked last month was almost of record proportions. And while immense tonnages of malleable and basic were sold, yet foundry iron for an agreeable change had more than its share. For a long period the greatest activity in the market has been in the special irons—those for steel and malleable purposes—but now foundry iron has been exceedingly active, writes Matthew Addy & Co. The most notable thing about the present buying is the desire to place contracts for delivery as far ahead as possible. There is one bad feature of the situation and that is the fact that the railroads are unable to handle business with anything like promptness. This is particularly true of coal and coke. Freight is congested at many places and, generally speaking, freight service is slow and unsatisfactory. There seems to be a practically unlimited amount of finished business offering. In fact, the gross volume of the iron trade in all branches this year will pass all records. It was thought a short time ago that perhaps the malleable shops had outbuilt the immediate needs of the country, but this is shown to be a mistaken idea, as there is now more work for the malleable concerns than they are able to handle. As for the steel mills, many of them are so tied up with business that they can accept no new specifications for any delivery this side of July. So it goes in one great trade department after another. Wherever you turn there is activity, real business in hand and expectations based not on hope but on visible future needs.

NEW YORK METAL MARKET, FEBRUARY 8.

Copper, Prime Lake	$13.75
Copper, Electrolytic	13.60
Lead	4.70
Spelter	6.00
Antimony, Cooksons	8.50
Straits Tin	32.65

CHICAGO IRON MARKET, FEBRUARY 9.

Lake Superior Charcoal	$19.50-$20.00
Southern, No. 2 Foundry	18.35- 18.85
Northern, No. 2 Foundry	19.00- 19.50

February 1, 1910.

Foundry iron was the same as the week previous.
$1 more a ton than year previous.
Copper was ⅛ cent more a lb. than month previous.
⅛ cent less than the year previous.

NEW YORK OLD METAL MARKET.

Dealers' buying prices are as follows:

Heavy crucibled copper	$12.00	to $12.25
Light copper	10.62½	10.87½
Plumbers' cocks and faucets	9.75	10.00
Heavy lead	4.25	4.50
Tea lead	4.00	4.10
Solder joints	7.25	7.50
Block tin pipe	30.50	31.50

OLD IRON EASIER.

With the lowering quotations for pig iron, old material is easier. Some inquiry for foundry stock is apparent, but in general business is very dull. A shipment of mixed scrap from Panama this week amounting to 1,200 tons was sold at $13.30 to the local dealer. Prices are as follows, New York delivery:

No. 1 Yard Wrought, long	$17.50 to $18.00
No. 1 Yard Wrought, short	16.50 to 17.00
Heavy Cast Scrap	15.00 to 15.50
Wrought Pipes and Tubes	16.00 to 16.50
Cast Borings	12.00 to 12.50
Stove Plate	11.50 to 12.00

NEW PLUMBING LAW FOR PORTLAND, ORE.

Plumbing Inspector Wm. Hey, Portland, Ore., has prepared a new plumbing ordinance for that city which will be introduced at the next meeting of the city council. Mr. Hey hopes that the council will take favorable action on the measure, as he considers the plumbing laws of the city in great need of revision.

Plumbing Inspector Frank L. Avery, Holyoke, Mass., has been presented with a solid gold-badge by his fellow members in the Massachusetts Association of Plumbing Inspectors. He retired on January 12 from the office of president of the state organization after two terms in office. The badge is in the form of a shield. In the center of the face of the shield is a neatly engraved reproduction of the seal of the city of Holyoke, around which Mr. Avery's name and title, "Plumbing Inspector," are engraved. The reverse side of the badge bears the inscription, "Presented by the Massachusetts Association of Plumbing Inspectors, January 12, 1910."

NEW YORK PLUMBERS' CONVENTION WILL BE HELD IN THE HOTEL ASTOR IN NEW YORK CITY.

The New York State Association of Master Plumbers will hold its annual convention in the Hotel Astor in New York City on Tuesday and Wednesday, March 8 and 9, 1910, according to official notice just issued. The Manhattan Branch of the Greater New York Association at its regular meeting last week elected the following delegates as its representatives at this important convention: B. A. Buge, Ed. J. Brady, T. S. Cochrane, Jr., W. J. Renehan, W. J. McDermott, Aug. Hansen, F. J. Fee, William Thompson, J. A. Rossman, James D. McEntee, John Renehan, Geo. H. Creasy, Philip Smith, Jere L. Murphy, John J. Kennedy, T. J. Tuomey, M. J. O'Brien, Chas. Murphy, John Smith No. 1, B. F. Donohoe, John J. Dowling, J. J. Falihee, Philip Brady, David Deigan, Jere J. Delany, Jas. F. Kelly, Jno. Byrns, Isaac J. Brown, T. F. McCaul, Frank Reynolds, Chas. A. Walsh, Wm. Young No. 1, T. A. Hill, Jas. Smith, Cuno Muller, Jno. Mitchell, T. J. Cummins, A. E. Jackson, F. B. Lasette, James P. Knight and James D. McEntee. The following gentlemen were elected as alternates: I. J. Barth, Jas. S. Cully, Milton Schnaier, Jno. T. McMahon, Thos. J. Ivans, Samuel Klein, W. P. Smale, John McCarron, A. S. Gaynor, Morris Jarcho, Philip Eich, J. F. Griffin and Ed. Hurley.

WILL CELEBRATE INSTALLATION OF NEW OFFICERS.

The North and West Side Master Plumbers' Pleasure Club of Chicago will celebrate the installation of its new officers with an elaborate luncheon and a vaudeville entertainment to its members and invited guests at its clubrooms, 1514 Milwaukee avenue, Chicago, on Monday evening, February 14. The officers to be installed are: President, Peter Feltmann; vice-president, Wm. F. Bahn; secretary, C. H. Jespersen; financial secretary, L. A. Clausen; treasurer, Fred Grosch. E. J. Benning, chairman of the entertainment committee, is arranging to make the event most pleasant and enjoyable.

GOVERNMENT CONTRACTS TO BE AWARDED.

Supervising Architect James Knox Taylor, Treasury Department, Washington, D. C., will receive sealed proposals as follows:

Until 3 p. m., Feb. 21, 1910, for the extension and remodeling (including plumbing, gas-piping, heating apparatus) of the U. S. postoffice at Pawtucket, R. I.

Until 3 p. m., Feb. 25, 1910, for the construction (including plumbing, gas-piping, heating apparatus and electric wiring) of an extension to the U. S. postoffice at Goldsboro, N. C.

Until 3 p. m., Mar. 2, 1910, for the extension and remodeling (including plumbing, gas-piping, heating apparatus and electric wiring) of the U. S. postoffice and courthouse at Meridian, Miss.

Until 3 p. m., Mar. 3, 1910 for the construction of an extension (including plumbing, gas-piping, heating apparatus and electric wiring) at the U. S. postoffice and courthouse at Lynchburg, Va.

Until 3 p. m., Mar. 4, 1910, for the construction complete (including plumbing, heating and electric wiring) of the U. S. postoffice building at Lead, S. Dak.

Until 3 p. m., Mar. 9, 1910, for the extension and remodeling (including plumbing, heating, gas piping and electric wiring) of the U. S. postoffice and courthouse at Athens, Ga.

Until 3 p. m., Mar. 11, 1910, for the extension and remodeling (including plumbing, heating, gas-piping and electric wiring) of the U. S. postoffice and court house at Jackson, Tenn.

Until 3 p. m., Mar. 14, 1910, for the extension and remodeling (including the plumbing, heating, gas-piping and electric wiring) in the U. S. postoffice and courthouse at Frankfort, Ky.

Until 3 p. m., Mar. 15, 1910, for the construction (including plumbing and drainage) of the U. S. postoffice and courthouse at Denver, Colo.

Until 3 p. m., Mar. 16, 1910, for the extension and remodeling (including plumbing, gas-piping, heating apparatus and electric wiring) at the U. S. postoffice and courthouse at Danville, Va.

Until 3 p. m., Mar. 17, 1910, for the construction of the U. S. postoffice and custom-house at Richmond, Va.

Until 3 p. m., Mar. 18, 1910, for the extension and remodeling (including plumbing, heating, gas-fitting and electric wiring) of the U S. postoffice at Rome, Ga.

Until 3 p. m., Mar. 24, 1910, for the construction (including plumbing, heating, gas-piping and electric wiring) of an extension to the U. S. postoffice and court-house at Sacramento, Cal.

All the proposals submitted should be in accord with the drawings and specifications, copies of which may be obtained from the custodians at the above postoffices, or from the office of the Supervising Architect at Washington, D. C.

CONVENTION DATES.

Feb. 15 and 16, 1910.—Nineteenth annual convention of the Ohio State Association of Master Plumbers, at Youngstown, Ohio. The sessions will be held at Knights of Columbus Hall, and headquarters will be established at the Tod House. President, J. L. Riley, 157 McDonough St., Dayton, Ohio; secretary-treasurer, Eb Ellen, 4714 Central Ave., S. E., Cleveland, Ohio.

Feb. 25 and 26, 1910.—Annual convention of the Idaho State Association of Master Plumbers, at Boise, Idaho. The officers of the association are: President, S. T. Davis, Boise; vice-president, Frank Healy, Twin Falls; secretary, J. F. Cooney, Twin Falls; treasurer, A. C. Adelman, Boise.

Mar. 7 and 8, 1910.—Annual convention of the Kansas State Association of Master Plumbers, at Kansas City, Kans. Headquarters at the Grund Hotel. E. D. Draper, 730 Minn. Ave., Kansas City, Kans., secretary.

Mar. 8 and 9, 1910.—Annual convention of the New York State Association of Master Plumbers, at the Hotel Astor, New York City. President, Isaac J. Brown, 79 Fifth Ave., New York City; secretary, T. S. Cochrane, Jr., 222 West 36th St., New York City.

Mar. 8 and 9, 1910.—Annual convention of Oklahoma State Association of Master Plumbers. The place not yet decided upon. The officers of the association are: President, Gus Hanson, Oklahoma City; vice-president, W. V. Roesch, Shawnee; secretary, D. W. Fitts, Oklahoma City; treasurer, Walter Newman, Shawnee, Okla.

Mar. 14, 15 and 16, 1910.—Annual convention of the National Association of Jobbers of Wrought Pipe and Fittings, at the Fort Pitt hotel, Pittsburg, Pa. The officer of the association are: President, A. E. Ford, Philadelphia; first vice-president, C. H. Simmons, New York City; second vice-president, O. F. Felix, Pittsburgh; treasurer, C. G. Cornell, Jr., New York City; advisory secretary, T. James Fernley, Philadelphia; secretary, Thos. A. Fernley, Philadelphia.

Mar. 16 and 17, 1910.—Spring meeting of the National Association of Brass Manufacturers, at the Hollenden Hotel, Cleveland, O.—Commissioner Wm. M. Webster, Schiller Bldg., Chicago.

Apr. 5, 6 and 7, 1910.—Annual joint convention of the American Supply and Machinery Manufacturers' Association and the Southern Supply and Machinery Dealers' Association, in Jacksonville, Fla. Headquarters at the Seminole Hotel. Alvin M. Smith, Richmond, Va., secretary and treasurer of the Southern Association.

New England Notes

MASSACHUSETTS.

The board of fire commissioners, at Springfield, Mass., has advertised for bids for plumbing, heating and ventilating the new fire department headquarters building and new substation. The plumbing bids will be received separately and the heating and ventilating jointly. The proposals will be opened at noon on Thursday, February 17, under the customary conditions. Copies of the plans and specifications of the two buildings can be secured at the office of the architect, B. Hammett Seabury, 21 Besse place, Springfield.

O'Toole Brothers, Clinton, Mass., have the contract for installing the heating plant in the new Woolworth store in the Morse block.

Alderman Robinson's plan for the remodeling of the city hall at Beverly, Mass., calls for the installation of an up-to-date system of ventilation among other improvements. The matter is now being considered by the board of aldermen and final action is expected shortly.

F. F. Taylor, Holden, Mass., has been awarded the contract for installing plumbing in George D. Caswell's new house on High street.

D. W. Bovette, who for the past 14 years has conducted a plumbing and heating business at 15 Melville street, Pittsfield, Mass., has sold a half interest in the business to N. H. Crissey, the stove repair man, and the firm henceforth will be known as Bovette & Crissey, doing business at the old stand on Melville street.

William B. Bull will soon move his plumbing establishment into his new building on Main street, Lenox, Mass.

A radical change in the system of heating in several of the town's buildings at Leominster, Mass., is advocated by the selectmen, and the voters will be called upon to decide whether the recommendations will be accepted at the coming town meeting. The plan is to have a central heating station for all town buildings with the exception of some schools, the Lancaster street fire station and the station at North Leominster. According to the present plan two school buildings will be included in the new heating system insuring a saving in cost for school coal. With a central heating station it is figured there would be a saving in the wages of janitors as well as the amount of fuel annually consumed.

Stephen Garrity, the plumbing inspector of the board of health, Lowell, Mass., has recommended to the board that the basements of the public school houses be provided with free shower baths. The board of health has taken the suggestion under advisement.

The municipal building commission at Springfield, Mass., has voted to readvertise the contracts for the heating, ventilating and plumbing of the municipal group. Several minor changes have been made in the plans, which make it desirable that new bids should be submitted for the work.

ON THE NEW ENGLAND COAST.

Guy Weatherbee has purchased a half interest in the plumbing, tin ware and general store of B. A. Thomas at Dover, Me. A corporation is soon to be formed to take over the business. Mr. Weatherbee comes from Milo, Me.

J. A. Cyr, who for some time past has been in the employ of F. O. Dupont as a plumber, has opened a plumbing establishment of his own in connection with the hardware store of S. E. Briggs & Son, Caribou, Me.

J. C. Trefethen & Co., Peterboro, N. H., have purchased the tinsmith and plumbing business of Nicholas Brothers, one of the oldest established business enterprises in this town. The new firm comes from York Beach, Me., having been in business there for the past 14 years. Wayland S. Nichols, the junior member of the firm of Nichols Brothers, will be associated with the new firm for the present.

The state board of health has prepared plans for the ventilation of the capitol building at Montpelier, Vt., which have been approved by Governor Prouty. The plans call for the expenditure of $37,000. By the act of the legislature the work must be completed on or before June 1, 1910, and there is some doubt as to whether the work can be completed before that time, the contract not yet having been let.

The Master Plumbers' Association of Providence, R. I., is considering the opening of a technical school for plumbers, it being claimed that the apprentice system has broken down under the restraints put upon it by organized labor, and not only are there too few plumbers, but those who do find their way into the trade are not all properly trained.

CONNECTICUT.

The Buckingham-Routh Co., New Haven, Conn., has the plumbing and metal work contract, and the Ford & Keyes Co. in that city the heating contract for the new building of the Connecticut Agricultural Experiment Station.

The Danbury Plumbing Co., Danbury, Conn., a newly organized firm, has leased the building at 4 Keeler street, lately occupied by James H. Ryan, plumber, and will engage in plumbing, heating and general repair work.

The health department of Meriden, Conn., has secured an appropriation of $600 to pay the salary of the inspector of plumbing for the present year. This is an increase of $200 over the amount voted for that purpose last year, the increase being called for because of the large amount of extra building and the necessary increase in the duties of the plumbing inspector. A still further gain in building is anticipated the coming year.

W. H. Perkins, Cheshire, Conn., has been granted a patent on a wrought-metal fitting for plumbers' use. The assignee is the Waterbury Manufacturing Company, Waterbury, Conn.

Peter J. Leonard, James T. Leonard and James T. Gannon, Wallingford, Conn., have organized the Leonard, Gannon & Leonard Co. for the purpose of carrying on the plumbing business in this city and have filed articles of incorporation with the secretary of state at Hartford. The officers of the new corporation are: President, James T. Gannon; secretary, James T. Leonard; treasurer, Peter J. Leonard. The capital stock of the company is placed at $2,500. The firm has purchased the business of the Wallingford Heating & Plumbing Co. and is located in the former's quarters at 18 Center St.

The contract for the plumbing in connection with the changes to the Yale Art School on Chapel St., New Haven, Conn., has been awarded to T. W. Corbett.

The high school building commission, Willimantic, Conn., has voted to have the boilers of the heating plant for the proposed new school building placed in a separate structure some distance from the school, and the architect has been instructed to draw his plans along that line. As soon as the plans are completed proposals for the heating, plumbing and other work will be asked.

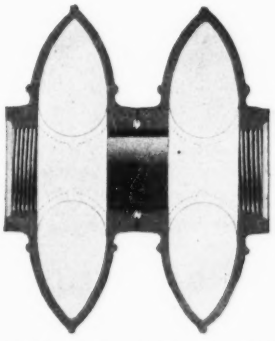
William Barrett, proprietor of the plumbing establishment on Main street, Winsted, Conn., and Miss Alice Scanlin, daughter of Mr. and Mrs. John Scanlin of Wallins street, were married on January 6, but had planned to keep the wedding secret for a time. The news leaked out a few days ago, however, and the couple are now receiving the congratulations of their many friends.

PLAN TO AMEND PLUMBING ORDINANCE OF HARDFORD, CONN.

The board of health at Hartford, Conn., has proposed the following amendment to the city ordinances relative to the licensing of plumbers, and the matter is now being considered by the board of aldermen to be acted upon at the next meeting: "The board of health shall issue licenses to plumbers as hereinafter provided and shall keep a record of all licenses so issued. Every plumber carrying on his trade in the city of Hartford must on or before April 1, 1910, apply to the board of health for a license as a plumber and shall before receiving such license be examined as to his qualification as a plumber in accordance with such rules and regulations as the board of health may prescribe. Every master plumber while engaged in the plumbing business in the city of Hartford who is not himself a licensed plumber shall after the first day of April, 1910, have in his employ at least one licensed plumber. Every master plumber shall display in a prominent and conspicuous place in his place of business his own license, or if he is not himself a licensed plumber the license of at least one of the licensed plumbers who may at that time be in his actual employ and shall not so display any license other than his own unless the plumber holding said license is actually working for him.

"All Right on the Job."

One of the features of AMERICAN Radiators which makes them popular is the tight and easy "make-up." The connections are as tight as a locomotive boiler, and insure safe outfitting—no worry that the radiation will not be "all right on the job."



Showing Nipple Screwed Into Two Sections

Our improved Right and Left Hand Nipples with 60 degree threads make the tightest joint known to radiator mechanics.—Just note the transverse view of a nipple screwed into the two sections herewith. It stands for tightness, tensile strength, safe shipments and general durability.

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With the Makers

"OMALA" FIXTURES IN DEMAND.

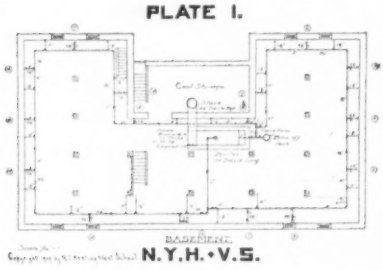
The Galard Co., 327-341 Sixth avenue, Newark, N. J., sole manufacturers of the "Omala" white finished plumbing fixtures, report a constantly growing demand for these products. This favor with the trade is, in their opinion, due to the fact that their white tanks and seats will stand the wear and tear of constant use in hotels, hospitals and public buildings, and still retain their white color. The "Omala" finish is extensively used on medicine cabinets, mirrors, bath-stools, bath-tub seats, closet seat and tanks. It is guaranteed to be impervious to the effect of alkalies, acids, gases, temperature and moisture, and that it will not crack, flake or split. Being non-absorbent all insanitary features are entirely eliminated by its use, it's asserted. The Galard company has opened offices at 706 to 709 Marquette Building, Chicago, under the management of Geo. J. Peppard, in order to serve its western trade promptly.

A NOVEL COURSE OF INSTRUCTION IN HEATING AND VENTILATION.

Steam and hot-water heating, with both gravity and forced circulation, together with fan-blast heating and ventilating, are the subjects of a remarkable course of instruction laid out by the New York Heating and Ventilation School, 1123 Broadway, New York.

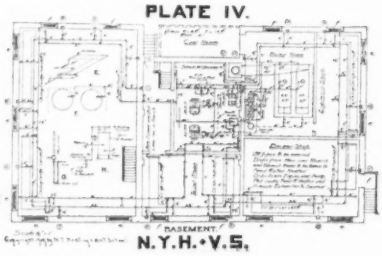
The instruction is carried on entirely by correspondence. The lessons take the student through every branch of commercial heating work and contain a fund of information which makes each subject a complete course in itself.

PLATE I.



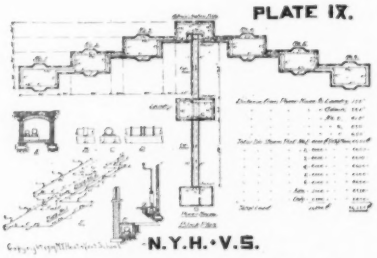
One of the Lesson Sheets of Lesson 1.

PLATE IV.



One of the Lesson Sheets of Lesson 2.

PLATE IX.



One of the Lesson Sheets of Lesson 4.

The wide scope of the course may be seen from the character of the first few lessons. Lesson 1, for instance, deals with the design of a low-pressure steam, one-pipe, up-feed, gravity-return system. Lesson 2 takes up an exhaust-steam, one-pipe, down-feed system. Lesson 3 is a factory job, low-pressure steam, two-pipe, down-feed, gravity-return, operated from an isolated plant. Lesson 4 is a design for steam heating a group of buildings, with gravity-return, from an isolated plant. Another group of lessons covers the subject of mechanical ventilation, while a third group takes up forced hot-water heating, the course closing with a discussion of vacuum-heating systems and a review giving the derivations of the formulas used.

The scheme, briefly, is to mail the student a set of plans showing a completely laid out heating and ventilating system. With these plans is furnished a key or code sheet. The code sheet contains the rules and other information by which the size, capacity, etc., of all apparatus are obtained. Accompanying the set of plans are blank plans of a building similar in construction to that shown in the completed set, but varying sufficiently to require a new layout.

After the student has become familiar with the completed plans and thoroughly understands the method of design and rules of calculation, he proceeds to figure and lay out the blank plans which form the lesson. His work is then returned for correction and comment, care being taken not only to point out any errors made, but to add suggestions, when necessary, for improvements in the design itself.

It is of interest to know that the course has been designed under the direct supervision of Mr. J. M. Harrison, vice-president and chief engineer of the Harrison Engineering Co., New York, manufacturer of the Harrison Air Tube Heater.

The methods of instruction as well as the terms for the course are told in detail in a newly-issued catalogue which can be had on request, mentioning this journal.

NEW EDITION OF WASHINGTON PLUMBING CODE.

The sixth edition of the plumbing and gas-fitting regulations has just been issued by the Inspector of Plumbing for the District of Columbia, comprising a book of 129 pages, vest pocket size. The new code has been very favorably commented upon by a great many master plumbers and others who are directly interested. The arrangement of the index of the book's contents shows that very thorough consideration was given to this essential part of such books. The new code, which has been gotten out mainly through the efforts of Plumbing Inspector Alfred R. McGonegal, comprises all the amendments and changes made in the old laws and regulations which were issued in September, 1907, and a new set of gas-fitting regulations. Of the 130 sections of the new issue of the plumbing regulations amendments or changes were made in about 25, all changes which have and will increase the standard of the plumbing installation in the district, but by some of which the master plumber is put to a trifle more expense in securing permits, paying for cuts in street, and for the repairs to a tap made in sewers, which expense, however, he can naturally revert back onto the owner of the property for whom the work is being done. The books are issued in three bindings, paper, cloth and leather, for which the department makes a charge of 15 cents, 30 cents and 50 cents, although each registered master plumber and gas fitter has been given a cloth-bound copy free.

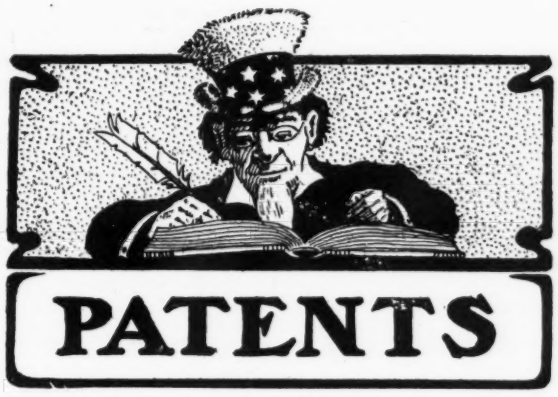
Random Notes.

Henry B. Davis, Inspector of Plumbing for the District of Columbia since Dec. 1, 1902, has resigned his position, and associated himself with the firm of Samuel J. Prescott & Co., Inc., contractors and engineers at Washington, D. C., and has been elected secretary of the company and made a member of the board of directors. Alfred R. McGonegal, who has held the position for the last four months, while Mr. Davis was on a leave of absence, has been appointed as his successor.

Allen, Myers & Co., 1821 Second Ave., Rock Island, Ill., has been awarded the contract for the installation of plumbing, steam-heating and ventilating systems in the new Grant school. The consideration is in the neighborhood of $10,000. Architect O. Z. Cervin, Rock Island, prepared the plans. Allen, Myers & Co. also has secured the contract for installing the hot-water heating system in H. E. Curtis' new residence at $1,000.

Jerry Ryan has sold his interest in the Shanley-Boyd Plumbing Co., 319 Perry St., Davenport, Ia. The business will be continued under the same name as heretofore and William Shanley will be its president and manager, while Frank Boyd will serve as secretary and treasurer.

John H. Stevens has purchased the interest of his partner, John J. Bradley, in the plumbing and steamfitting business of Stevens & Bradley, 84 Manchester St., Manchester, N. H.



947,782, Water-Closet.—Joseph A. Barr, Rochester, N. Y. The claims made for this invention, read in part as follows: "The combination with a bowl having a sealed discharge, of a tank, a flushing siphon having its long leg sealed by said discharge seal and its short leg in the tank, a starting siphon within the tank having its high point below that of the flushing siphon and also below the top of the tank and having direct communication with the high point of the flushing siphon whereby the starting siphon will operate the flushing siphon automatically when the water in the tank reaches a certain level."

947,786, Waste and Overflow Trap.—Edward W. N. Boosey, Detroit, Mich. Among the claims made for this invention the broadest is as follows: "A waste and overflow trap consisting of a casing having two inlets, an outlet and a closable opening, a partition between the inlets and the outlet having a horizontal and a vertical part forming channels in the casing whose cross sectional area is practically equal to the area of the outlet, and a water seal chamber below the horizontal part of the partition; the two inlet channels uniting at a point between the horizontal part of the partition and the water line of the seal chamber and being arranged to direct water flowing there-through downwardly into the seal chamber, substantially as shown and described."

947,801, Steam-Trap.—Lyman M. Cooper, Flint, Mich., assignor of one-third to Arthur E. Stever, Flint, Mich.

947,817, Cesspool and Trap.—Joseph G. Hayes, Indianapolis, Ind., assignor to Hayes Brothers, Inc., Indianapolis, Ind., a Corporation of Indiana. The U. S. Patent Gazette describes this invention as follows: "In a cesspool, the combination with an exterior basin having an open outwardly flaring top side, a grate fitted in said open outwardly flaring top-side, a removable catch-basin having an open top side, said basin situated centrally in said exterior, and corner blocks formed integral with said exterior basin upon which said interior removable catch-basin rests, of a deflector having an open upper flaring portion and a lower open reduced portion, said deflector fitted into the open outwardly flaring top side of said exterior basin, depending supporting lugs having jogged bottom end portions, said lugs formed integral with said deflector, and a suitable trap."

947,990, Sewer-Cleaning Device.—Marx Harbeck, Davenport, Iowa.

948,033, Waste-Plug Mechanism for Lavatories and the Like.—James Allingham, Chicago, Ill. This invention is described in part as follows: "In a waste plug operating mechanism the combination with a suitable fixture having a waste aperture in its bottom of a waste plug adapted to close said aperture, a rotatable cylinder seated upon the slab of the lavatory, and provided with spiral slots, a rod extending downwardly therefrom, means rigidly engaged to the rod extending into the spiral slots and adapted to vertically adjust the rod by rotation of the cylinder, a horizontal rod, means rigidly connecting the rods preventing relative movement thereof, a short vertical rod loosely connected with the horizontal rod and vertically movable means rigidly connected to the short vertical rod adapted to support the waste plug and to elevate the same."

948,075, Plug-Cock.—Henry J. Richard, Danbury, Conn. This invention is described as follows: "A plug cock comprising a body having a passage through it and a transversely arranged tapering opening intersecting said passage, a plug in said opening provided with a reduced portion forming an annular shoulder, said reduced portion being provided with longitudinal recesses, and a threaded stem projecting through the bottom of said opening, and a removable shell fitting on said reduced portion and provided with internal ribs engaging said recesses, one end of said shell abutting said shoulder, a washer on said stem engaging the other end of said shell, and means engaging the projecting end of said stem for holding said plug in position within said body."

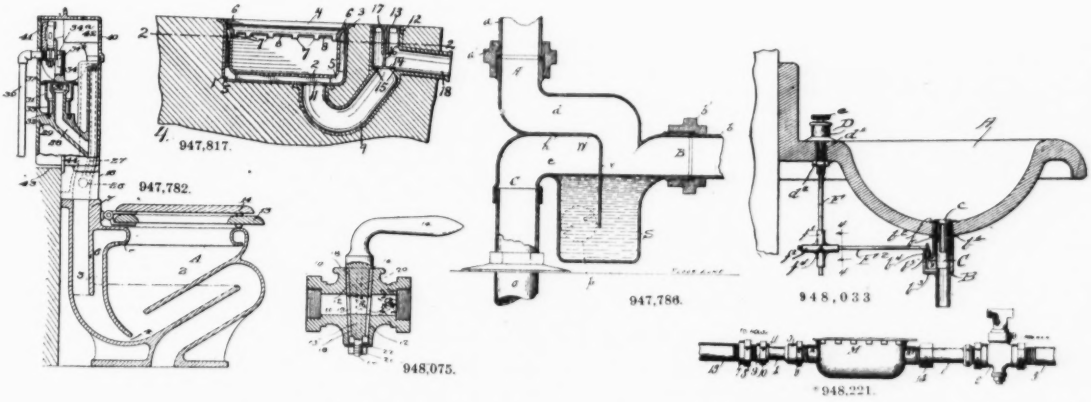
948,102, Pipe-Threading Machine.—David C. Walter and Edward L. Troup, Toledo, Ohio.

948,168, Pump.—Jesse B. Garber, Salem, Ohio, assignor to The Deming Company, Salem, Ohio, a Corporation of Ohio.

948,169, Valve-Gage and Valve for Pumps.—Jesse B. Garber, Salem, Ohio, assignor to The Deming Company, Salem, Ohio, a Corporation of Ohio.

948,221, Adjustable Coupling.—Fredrik Hanson, Rome, Ga. The claims made for this invention are as follows: "In a device of the class described, a meter provided with oppositely disposed, threaded teats; a supply pipe; a rigid coupling uniting the supply pipe and one teat; a service pipe; a nipple enlarged at one end to form a coupling nut to engage the other of said teats, the nipple being of less diameter than the service pipe and being arranged to be received within the service pipe; a coupling member threaded to engage the exterior of the service pipe and having a reduced neck adapted to receive closely and in sliding relation, the end of the nipple, and to space the nipple against contact with the walls of the service pipe; a stuffing box threaded to engage the end of the reduced neck of the coupling member and to compact a packing about the nipple; and a bridge pipe having means for connection with the rigid coupling and with the coupling nut, when the rigid coupling and the coupling nut are disengaged from the teats."

948,302, Pump.—William H. Heard, London, Ontario, Canada.



Classified Advertisements

Advertisements under this heading 4 cents per word per issue, address included. Remittance to be made with order. To insure insertion copy should be received not later than Wednesday morning.

Salesmen Wanted

WANTED—STEAM AND HOT WATER BOILER SALESMAN. Chicago or road territory open. Address No. 202, "Domestic Engineering," 325 Dearborn St., Chicago.

WANTED—FIRST-CLASS REPRESENtative in the boiler and radiator line for territory adjacent to Chicago. Address No. 201, "Domestic Engineering," 325 Dearborn St., Chicago.

WANTED—SALESMAN FOR NORTHern Indiana and southern Illinois, experienced in steam, hot water and plumbing goods. Address No. 218, "Domestic Engineering," 325 Dearborn St., Chicago.

WANTED—COMPENTENT SALESMAN, thoroughly posted on heating and power supplies to canvass the factory and mill trade in a large city. Address with full particulars, etc., No. 200, "Domestic Engineering," 323-325 Dearborn St., Chicago.

WANTED — SALESMAN FAMILIAR with general line of plumbing and heating goods, to travel in southern Michigan, northern Indiana and northwestern Ohio. State fully experience amount of annual sales and salary expected. Address No. 199, "Domestic Engineering," 323-325 Dearborn St., Chicago.

WANTED — ENGINEER SALESMEN for industrial and central heating and power plants, to travel in middle West territory. Must have had technical training and at least five years' experience in selling heating systems and power station equipment. High-grade men with first-class references only need apply. Address No. 217, "Domestic Engineering," 325 Dearborn St., Chicago.

WANTED—A SEPARATE SALESMAN for each of the territories mentioned below, by a manufacturer of plumbers' brass goods. If applicant for any particular territory does not want or need all of that territory it would be more satisfactory to us. The more confined his territory, the better satisfied we will be. Must be prepared to cover often and call on the jobbers. Commission basis. (1) Central New York, (2) New England, (3) New York City, (4) Ohio, Indiana, Michigan, Louisville and Pittsburg, Toledo center, (5) St. Louis and Kansas City, (6) Iowa and Nebraska, (7) St. Paul and territory and Duluth, (8) Ft. Worth, Texas, (9) Denver, (10) Salt Lake City, (11) New Orleans, (12) Southeastern States, omitting New Orleans, center, Atlanta, Ga. Address No. 220, "Domestic Engineering," Chicago.

Plumbers and Fitters Wanted

WANTED — SUPERINTENDENT TO take charge of heating department of large concern; salary or salary and percentage of profit of department; state age, experience and salary expected; give references. Address No. 213, "Domestic Engineering," Chicago.

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A JOBBER WHO IS DESIROUS OF combining with other jobbers in producing a fixture catalog, invites correspondence. Address No. 214, "Domestic Engineering," Chicago.

PERSONAL

Charles H. Denison,

CONSULTING PRACTICAL SPECIAList. Low Pressure Steam Heating, Hot Water Heating, Gas, Plumbing and all business affairs relating to the craft. Address 2730 Wilcox Ave., Chicago.

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SITUATION WANTED—BY PLUMBER, steam and gas-fitter with fifteen years' experience, in Northwest; state salary. Chas. Schroff, Ashton, S. D.

POSITION WANTED—BY SALESMAN, two years' experience and acquainted with trade in lower Michigan, Ohio and Indiana; good references. Address No. 215, "Domestic Engineering," Chicago.

WANTED—SITUATION BY PLUMBER; young man; 10 years' experience; good at tinning and hot water heating. Go anywhere. Address No. 225, "Domestic Engineering," 325 Dearborn St., Chicago.

WANTED—A POSITION AS SUPERINtendent, who has had a large experience in the manufacture of plumbers' supplies and sanitary specialties. Can handle help and produce the goods. Address No. 226, "Domestic Engineering," 325 Dearborn St., Chicago.

POSITION WANTED—BY PLUMBER and steam-fitter with five years' experience as foreman and estimator, with first-class firm, either city or country; capable of taking charge of business. Temperate and married. Address No. 216, "Domestic Engineering," Chicago.

For Sale

FOR SALE—FIRST-CLASS PLUMBING and heating business in Colorado; present owner wishes to retire on account of old age. Address 224, "Domestic Engineering," Chicago.

FOR SALE—PLUMBING, HEATING and tinning business at inventory; town of 7,500; books show best trade in town. Come quick and do business. S. A. Teel, Bangor, Pa.

FOR SALE—PLUMBING AND HEATing business in New Jersey; reason, owner's health; will sell at fair price. Address No. 220, "Domestic Engineering," 325 Dearborn St., Chicago.

FOR SALE—PLUMBING AND HEATing business; eastern part of Iowa; population 5,000; a bargain; owner has other business. Address 223, "Domestic Engineering," 325 Dearborn St., Chicago.

FOR SALE—PLUMBING, HEATING and gas-fitting business; in town of 30,000; new waterworks about to be installed. Address No. 222, "Domestic Engineering," 325 Dearborn St., Chicago.

FOR SALE—PLUMBING AND HEATing business; western part of Wisconsin; population 5,000; Address No. 221, "Domestic Engineering," 325 Dearborn St., Chicago.

FOR SALE—AN ESTABLISHED MANufacturing business and equipment, consisting of patents, patterns, machinery, tools, and brass foundry equipment for producing high-grade plumbers' supplies, ballcocks, glass floats, etc. A few thousand dollars will buy this bargain. O. H. Jones Co., P. O. Box 27, Hartford, Conn.

FOR SALE—PLUMBING BUSINESS. A St. Paul master plumber, who has built up a fine trade in a desirable neighborhood, is unfortunately obliged to leave it because of illness in his family and will sell the small stock on hand and complete equipment of tools very reasonably. He owns the building, a fine semi-basement showroom and shop, with living apartment above, both hot water heated, which he will rent at a low price on a long lease. This is one of those unusual chances for an honest and competent man to build up a lucrative business. An honorable man, with good security, will be able to make easy terms. Address 219, care "Domestic Engineering," 325 Dearborn St., Chicago.

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LEARN PLUMBING ON NEW BUILDings in four months. Tools furnished. Master Plumbers' Trade School, 3659 Finney Ave., St. Louis, Mo.

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AIR VALVES FOR STEAM HEATING SYSTEMS. This book tells how, why and where air valves should be used. 5x7½ in.; 39 pp. Postpaid, 25 cents.

A COMPLETE GUIDE TO TESTING PLUMBING. A full treatise showing the necessity of testing new and old work; methods of testing fully described; 7½x5¼ in.; seventeen illustrations. Postpaid, 25 cents.

DEAN'S SYSTEM OF GREENHOUSE HEATING by steam or hot water; used for years; convenient and reliable; makes greenhouse heating estimating very simple. Flexible cloth bound, 5½x7¾ in., 46 pp. Postpaid, $2.00.

MAKING THE BUSINESS PAY. Letters of John Burton, retired successful plumber and steamfitter, to his nephew still in business. Practical, instructive, entertaining, a guide to better business. Cloth bound, 5½x7¾ in.; 168 pp. Postpaid, $1.00.

SWIMMING POOLS. Their construction; cold and hot water supply; various methods of heating the water; directions as to selecting correct sizes of heaters. A practical guide to the subject. Over thirty illustrations; 6¼x4¾ inches. Postpaid, 50 cents.

SIZE OF FLOW AND RETURN STEAM MAINS. Contributions from thirty heating engineers of different cities in United States, giving current practice; full of practical advice and useful tables. Bound in boards, 6¼x4¼ in., 104 pp. Postpaid, 50 cents.

TABLES FOR CALCULATING SIZES OF STEAM PIPES. These tables furnish a method of determining sizes of steam pipes for low pressure heating without laborious mathematical calculations. Bound in cloth; 4½x6⅞ in.; 47 pp. Postpaid, $2.00.

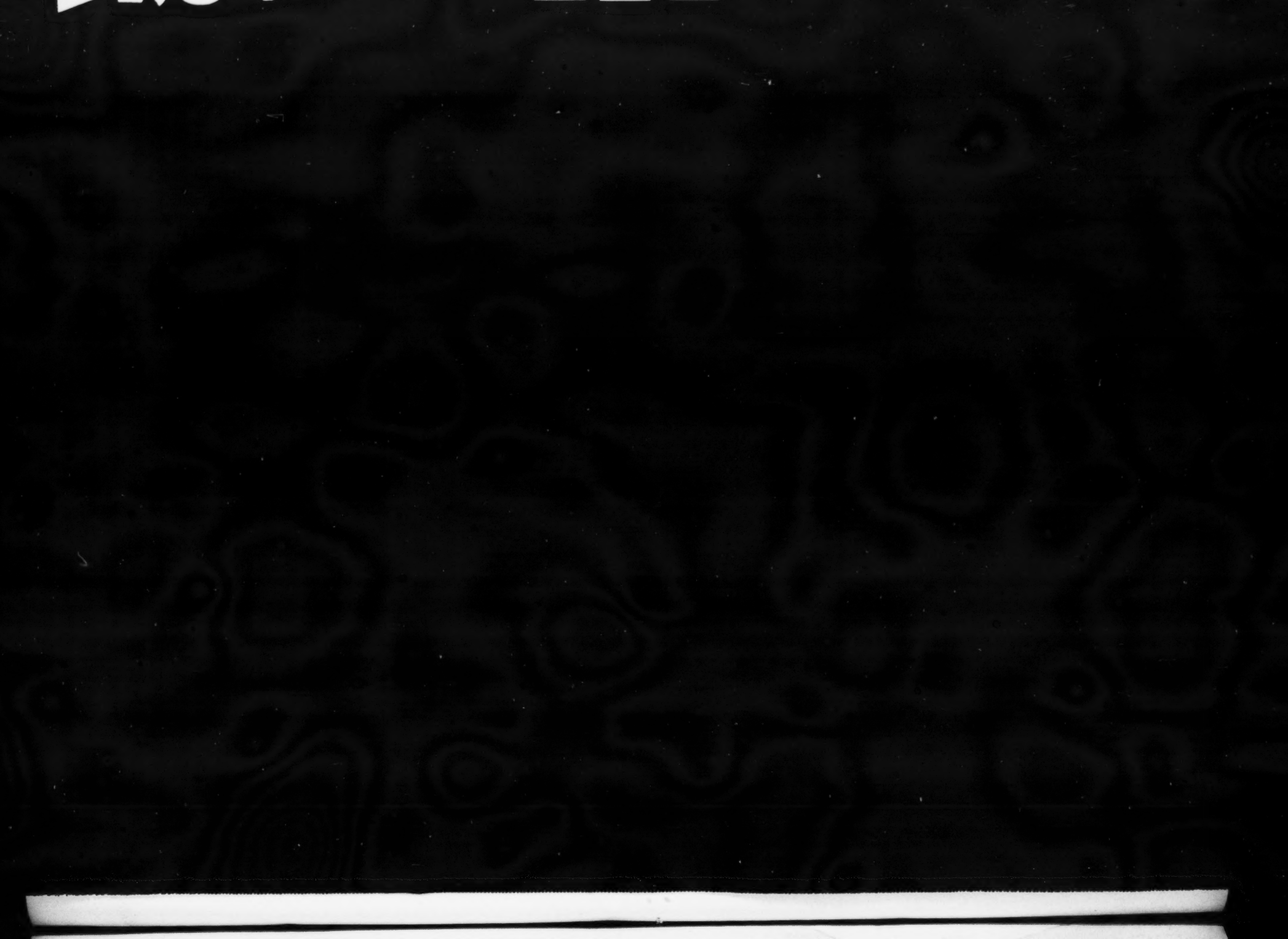
DEAN'S STEAM FITTER'S COMPUTATION BOOK. Tables for finding cubical contents of rooms and radiation required, also general information on points of interest to steam and hot water fitters. Flexible cloth bound, 5x7½ in., 90 pp. Postpaid, $2.50.

SANITATION IN THE MODERN HOME. An invaluable guide to the architect, plumber, heating engineer and house owner, telling just what is necessary to make a home completely sanitary from the subsoil to the roof. 8x5¼ in.; 272 pp.; bound in cloth. Postpaid, $2.00.

SANITARY SEWERAGE OF BUILDINGS. An authoritative statement of the principles and practice of sewering buildings, including the design and construction of plumbing systems, disposal of sewage in unsewered localities, etc. 8x5 in.; bound in cloth; 209 pp. Postpaid, $1.50.

ROUGHING-IN HOUSE DRAINS. A complete guide to the work of roughing-in plumbing, from the digging of the sewer to the finishing length of the soil and vent stacks, giving each step to be taken and telling how and why it is done. 6¼x4¼ in.; 184 pp.; bound in boards. Postpaid, 50 cents.

PLUMBING CATECHISM. Second edition. This book formulates, in question and answer form, the basic principles of plumbing design and practice. It is therefore especially commended to students in engineering and trade schools, and to master and journeymen plumbers, preparing for examinations. Bound in cloth, 6¾x4¾ in.; 125 pp. Postpaid, $1.00.

NOTES ON HEATING AND VENTILATION. Second edition. This book is a resume of lectures delivered to classes in heating and ventilation at the University of Michigan. It is written primarily for the steamfitter and designer of heating systems. Reduced to as brief a form as possible, so that readers can readily find notes or data desired. Bound in cloth, 6¾x4¾ inches; 272 pp.; postpaid, $2.00.

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